The Builder.

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Competition Design for Liverpool Cathedral : Interior ..... By Mr. Hubert C. Corlette.
Village Cross, West Meon ..... Mr. C. Harrison Townsend, F.R.I.B.A., Architect.
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The Parish Church and Abbey of Titchfield.

IN the beautiful Hampshire valley of the Meon, nine miles south-east of Southampton, and two miles west from Fareham, is the small ancient market town of Titchfield. In the centre of the town stands the parish church of St. Peter, of fair size and of much interest. It consists of a chancel of three bays, with south chapel, a wide nave of four bays, with north and south aisles and south porch, and western tower and spire.

Recent attention given to this church has resulted in the lower part of the small, unbuttressed western tower being pronounced to be of fairly early Saxon work. This was first noted by Rev. Dr. Cox, in the spring of 1901, and his surmise was confirmed by Mr. Peers when the church was visited by the Royal Archæological Institute, in July, 1902. The position of a blocked-up round window in the west wall of the nave shows that the tower was originally much lower than at present, and more of the nature of a porch, with probable side openings, like those of several early Saxon churches, such as Brixworth at its first building. Mr. Peers considers that the western arch of the tower is original, though tampered with at later dates, and that the south-west angle of the original nave remains, "with a triple lacing course of Roman brick, about 12 ft. from the ground, which also ran round the three exposed sides of the tower."

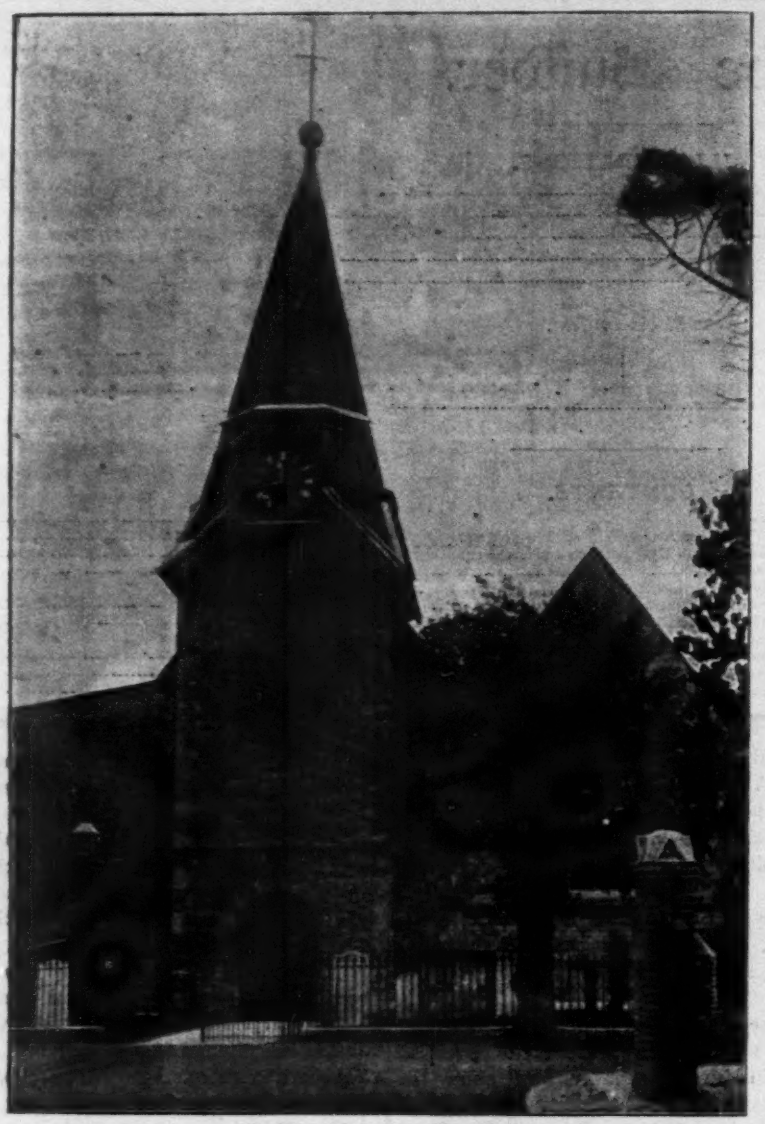
In the first half of the twelfth century the Saxon church was considerably enlarged, a south aisle being built, and a very good doorway, of three orders of zigzag mouldings, inserted as an improved entrance in the eastern archway of the tower. A new chancel must have been built at the same date. The chancel arch is pointed, but springs from semi-circular, substantial responds of undoubted Norman date. A variety of moulded stones, including portions of several Norman capitals and arch voussoirs, were found in the fabric during alterations and rebuilding of 1867. Some of these may now be seen in a curious position within the church, namely, heaped up in front of the low chancel screen on the south side of the nave.

In the year 1222, when this Norman church was standing, Titchfield began to grow in importance, for an abbey of Premonstratensian Canons was then founded about half a mile to the north of the town. Bishop Peter des Roches invited a colony of these White Canons to settle here from the Shropshire abbey of Halesowen. First among the foundation endowments of the abbey was the manor and advowson of Titchfield, and thenceforth, for more than three centuries, the fortunes of the church and town were fostered by the overshadowing adjacent monastery of the like name.

Ere long the rectory of the church became appropriated to the abbey, and formed the more substantial of its spiritualities; it was valued at the high annual rate of 58*l.* 6*s.* 8*d.* by Pope Nicholas's taxation of 1291. The church was also peculiarly under the care of the abbey, not only on account of its nearness to that religious foundation, but because the long series of vicars up to the time of the dissolution of the monasteries were chosen from among the canons of the convent. The canons of Prémontré alone among religious orders possessed the special privilege of appointing (if they desired it) their own members to act as vicars of churches in their gift, without any papal or episcopal dispensation. Such vicars had to be presented to the bishop for institution, and were "perpetual," but they continued to wear the white habit of their order, and to observe their rule in various particulars. They also remained members of the chapter of their own convent, and had to present themselves for visitation when the superiors of their order made their circuit. In the record of visitations of Titchfield Abbey in 1420, and again in 1478, the presence of the canon who was vicar, or perpetual curate, of the parish church of Titchfield is mentioned on each occasion.

It took the White Canons some time to erect their own conventual church and buildings, and it would appear that they soon afterwards took in hand or directed the extension and repairs of the parish church. The old west tower in front of the Norman work (which had been probably crowned with a belfry stage) was further heightened in the first half of the thirteenth century, though altered several times at subsequent dates. Later in the same century a south chancel chapel was built, and the Norman chancel removed to make way for a larger fabric in the English style. On the south side of the chancel are three pointed arched sedilia of that date, the one nearest to the east being on a higher level; beyond them is a trefoil headed piscina niche, with projecting drain. The arcade of two arches into the south chapel has enriched capitals to the pier and responds. This rebuilding of the chancel and erection of a south chapel would undoubtedly be the work of the abbot and canons, as they were the rectors. The monastery was dedicated to the Assumption of Our Lady, and this new chapel became the Lady Chapel of the parish church. It was always, however, specially identified with the abbey, and before this altar there was probably a special seat or throne for the abbot; in several pre-Reformation wills of different dates it is named as the "Abbot's Chapel." The founder of this chapel was probably William de Byketon, the fourth abbot, according to the old chartulary, but in reality the seventh, who is described as "ruling venerably the Church."

The monastery suffered with almost exceptional severity from the awful visitation of the Black Death in 1349. There are complete inventories extant of the corn and stock of the monastery and its manors or granges in 1348, and again in 1370. Although the interval of twenty-two years gave some time to recuperate, the contrast between the comparative affluence of the one date and the poverty of the other is most remarkable. For instance, in 1348



Titchfield Church: West End.

Titchfield Church: Interior.

the abbot and canons had 170 quarters of wheat, 175 of barley, and 198 of oats, and 28 of winter wheat; whereas in 1370 they had no wheat, and merely 5 quarters of barley and 16 of oats.

All this had probably its effect on the architecture and development of the parish church, but some time in the rule of John de Thomy, who was abbot from 1360 to 1379, the south chapel was enlarged, and the outer walls were rebuilt. The three somewhat quaint two-light windows, with ogee heads in the south wall, belong to this period, with a doorway beneath the centre one; these windows, as well as the three-light one at the east end, look singularly bare on the exterior, owing to the entire absence of hood moulds. There are three sedilia in this chapel of equal level, with ogee trefoiled heads, and a piscina niche of like style beyond them. The arch into the south aisle is of a plain character, and lacks capitals. In fact, all the work about this chapel, save the thirteenth century arcade on the chancel side, is of an impoverished character for the time of its execution, and doubtless reflects the embarrassed condition of the abbey's finances.

The south aisle is separated from the nave by an arcade of four arches, supported by octagon piers and responds of late fourteenth century style, but the outer wall of this aisle and other parts were generally reconstructed in 1867. The inner circle of the south wall is disfigured by some lines of various coloured bricks; there is, however, some justification in their presence, as they emphatically stamp the work as of the Victorian era.

The north aisle is separated from the nave by an arcade of four lofty arches, the spring of which is considerably higher than that of the opposite arcade. The piers and responds are slender, and formed of a group of four shafts round a centre. Their style, together with the bases and capitals, show unmistakably that they are of advanced fifteenth century work. The work of this aisle is usually assigned locally to Bishop Wickham; but this is an impossibility, as an arcade of this character can scarcely be earlier than 1450. The five-light east window, the four three-light windows on the north side, and the west window are of similar style, and good examples of the date. On each side of the east window is the handsome crocketed canopy of a large image niche, whilst the smaller one of the same kind is placed against the aisle side of the eastern respond. The roof of this aisle is a lead-covered lean-to of slight elevation; it has the original main timbers, and the supporting spandrels are plainly pierced. The roof of the nave is now high pitched and lead-covered.

The chancel, save on the south side, was rebuilt later in the perpendicular style, probably at the beginning of the reign of Henry VII. There is a fine five-light east window, and three three-light windows on the south side.

The tower at the west end, of Saxon origin, has been altered at various dates, and it is difficult to say whether the octagon-broached spire, covered with wooden shingles, was placed on it in the fourteenth or fifteenth century. It is crowned with a vane supported by well-wrought, elegant ironwork, giving the compass points, of eighteenth century date. The lowest stage of the tower still serves as a west porch, and the bellringers' chamber above is gained by an outer flight of stone steps against the north wall.

The south porch is modern, and of the same date as the aisle. On each side of the large east window of the chancel are two good canopied niches, one above the other. Part of the lower one on the north side is interrupted by a mural monument to Edward Ives, formerly surgeon of the *Kent*, commanded by Vice-Admiral Watson; he died in 1786. Against the south wall, close to the east end, is the mural monument of William Chamberlaine, 1608, and his wife, with their two sons and two daughters, their respective effigies are all represented in kneeling attitudes. His epitaph somewhat singularly ends with the old Catholic conclusion, "Upon whos soule our Lorde have mercie."

When the Hampshire abbeys were being forcibly "surrendered" to Henry VIII., the formal surrender of Titchfield was signed on December 28, 1537, by John

The Wriothesley Monument, Titchfield Church.

Gate-House, Titchfield Abbey.

Salisbury, the last abbot. He had been consecrated Suffragan Bishop of Thetford in the previous year, and held the abbey "in commendam." There were few people in England who took a more active part in the destruction of the monasteries or profited more by their destruction than Sir Thomas Wriothesley, the controller of the royal household. He obtained the houses and most of the possession of the Hampshire abbeys of Titchfield, Beaulieu, and Hyde, and for a time the friary of Southwick. By favour of the King, the whole of the possessions of Titchfield monastery, including the rectory and advowson of the vicarage of Titchfield Parish Church passed to Wriothesley, the very moment that the "surrender" was accomplished. The altar stones and monumental pavers and tombs of the conventual church were in progress on January 20, 1538, and the work of turning the abbey into a grand residence of Wriothesley begun. In this "right stately house embattled," as Leland termed it, Sir Thomas at once took up his residence. He was created Earl of Southampton by Edward VI., and naturally became the chief man of Titchfield and the district. The bad fortune that afterwards befel him and his son forms a striking feature in Spelman's "History of Sacrilege," and there has for many a long year been but little left of his great stately house, save the deserted entrance tower.

The Wriothesleys, as holders of the great tithe and of the vicarage advowson, and general successors to the manorial and other rights of the old abbots, not unnaturally treated the abbot's chapel of the parish church as their special property and burial place. Sir Thomas Wriothesley, K.G., Chancellor, Baron Wriothesley of Titchfield, and first Earl of Southampton, died at Titchfield in 1550, but was buried in the church of St. Andrew, Holborn. But in accordance with the will of his son Henry, the second Earl, who died in 1581, a most sumptuous monument was erected in the centre of the abbot's chapel in this church to the memory of his father and mother and himself. The body of the first Earl was removed here by the direction of his son, from the place of its first interment. The whole composition of this monument is a remarkably fine example of a late Elizabethan non-mural memorial, and is, on the whole, in very good preservation. The life-size effigy of the Countess occupies the highest, or centre, position; on her right hand is the effigy of her husband, the first Earl, in Chancellor's gown, and on her left her son, the second Earl, in late plate-armour. All three effigies retain much of the original painting. On the north side of the great monument are a son and daughter kneeling at a desk, and on the south side two daughters; the ends bear elaborate heraldic shields. At each of the four angles of the monument are tall obelisks of red-veined marble.

Against the south wall of this chapel is the mural monument, with small recumbent effigy of "Ye Ldie Marye Wryotheslye, fourth daughter of Henry, Earl of Southampton, who died in 1615, aged four years and four months." The Henry of this inscription was the third Earl, the friend and patron of Shakespeare; he was buried at Titchfield in 1624.

There is a singular lack of old fittings in this church. Almost the only bit of woodwork of any age is a single Jacobean coffin stool or support, now used as a seat to a prayer desk at the east end of the south aisle. The octagon font at the west end of the nave is modern.

Over the chancel arch at the west end of the nave is a painted embattled roodbeam. On the wall above is a well-executed painted rood of the Crucifixion, with St. Mary and St. John, with the words beneath, "So God loved the world." The painting was executed by Mr. C. E. Kempe, in memory of the Honourable Misses Baring, of West Hill, in this parish. Over the west doorway of the nave is a large wall painting of our Lord and the miraculous draught of fishes; it was executed in 1852, as a memorial to Rev. W. M. Cosser, vicar of the parish, and is

already suffering not a little from the passage of time.

It only remains to be added that the greater part of the good grey stone of this church obviously came from the long ago exhausted excellent limestone quarry of Binstead, in the Isle of Wight.

The Abbey of Titchfield, to the north of the town, was a building of considerable magnitude, largely rebuilt in the fifteenth century by Abbot William Autyn, and standing in the midst of a fine estate. It was renowned for its great fish ponds, four of which were a mile in length. When Richard II. and his queen paid a surprise visit to the abbot in 1393 they were nearly washed away by the bursting of one of the fish ponds a little distance from the abbey, but were to some extent appeased by the appearance of twelve great pike at the dinner table. A good deal as yet unprinted concerning the rule and condition of their house and estates can be gleaned from the three old registers or chartularies, in the possession of the Duke of Portland. The most interesting entry gives a full catalogue of the abbey's very large library, drawn up in the year 1400.

The fate of the abbey in the hands of Sir Thomas Wriothesley has already been mentioned. The new abbot's lodgings or house built by Abbot Autyn went by the name of "The Grete Place" (or palace), and Wriothesley gave the name of Place House to his reconstructed residence, which it still bears. This once fine mansion, which has so often changed hands, was successively a residence of the Earls of Southampton, the Earls of Gainsborough, the Dukes of Portland and Beaufort, and the Delmé family. The Delmés dismantled the buildings between 1780 and 1790, since which time they have been left a prey to the weather and the ivy. The ruins, however, still present a stately appearance, and sufficient remains to be able to trace the general plan of the old thirteenth century abbey. The cruciform church was aisleless, with a vaulted roof, and had a tower in the centre. The cloisters were on the north side of the church, having the chapter house with dormitory over it on the east, the refectory on the north, and the cellarer's range on the west, according to the usual plan. Wriothesley's chief alteration was to build up a great square gatehouse, with embattled corner turrets, which forms the chief feature of the present ruins, right in the centre of the nave of the church, pulling down the tower; he turned the refectory into his hall, and adapted the other buildings to domestic purposes.

THE ALEXANDRIA MUSEUM.

THE new Museum at Alexandria in Egypt has been formed during the past ten years, under an enthusiastic Committee of European residents, assisted by the patronage of the Anglo-Egyptian Government. The Government has been constituted owner of the antiquities within its walls, but the exceedingly well-designed building is the property of the Municipality, in the rear of whose offices on the high road between Alexandria and Ramleh it is built.

The Museum is now in course of enlargement to its full extent. It consists of six galleries crossing each other in such a way as to enclose four courtyards. At the intersections of these galleries are chambers in the form of Greek crosses, separated from the main corridors. Each gallery is about seven mètres wide* and thirty long; the only apertures for light are four openings in the ceiling of each gallery, each about three mètres square, which can be closed with blinds to exclude the glare of an Egyptian sun.

One might suppose the building to have been designed by the architect of the Museum at Athens. It resembles that building in many respects, but with the advantage, due to experience, of having top lighting everywhere. A large Greek portico entrance is the only external architectural feature. It is appropriate, although the line of its pediment hardly corresponds with the actual construction of the roof to the building. The collection of antiquities, which is remarkably representative of the Delta province, comprises the usual items of an Egyptian collection; "Disjecta membra" from rifled tombs, mummies in greater or less perfect state of decay, fragments of temples, &c. But the objects which give a particular interest to the collection are the Roman and Christian remains, and these are also remarkable for their quality as well as quantity. They are given a suitable prominence in the galleries of the Museum, so that at a first glance the characteristic Egyptian style is hardly noticeable in the collection.

The collection of Coptic monuments is very interesting, and includes stone tablets, carvings in various materials, and textiles. Some curious Christian emblems are noticeable amongst these fragments of detail. In one case the common Egyptian

Coptic Crosses on Stone Slabs: Alexandria Museum.

Tau cross (see sketch) has been fancifully treated in the style of a Byzantine throne, supporting what is evidently the sacramental loaf of bread. This idea is possibly almost unique.

Innumerable terra-cotta lamps of the usual forms, Græco-Roman figurines (some with well-preserved colours), and the inevitable pottery of all periods fill up most interesting show-cases along the walls, whilst many fine statues and architectural details are disposed in the galleries and the inclosed courtyards.

The once famous city of Alexandria has hitherto possessed but few attractions to the traveller of modern days, its ancient monuments seem so utterly lost to view beneath the repulsive squalor of an Arab town of the very worst description—even such of them as are still known to exist. "Pompey's Pillar," covered with the traces of past generations of philistine tourists, stands a melancholy monument of the greatest of ancient peoples in the midst of a filthy plague-stricken suburb. "Cleopatra's Needles" have been removed from their rubbish heaps to adorn cities greater than Alexandria. And so the European visitor anxious to see the splendours of Saracenic art in the true East, or the grand remains of ancient Egypt on the Nile, has always been only too glad to curtail his stay in Alexandria as much as possible.

Alexandria, however, now possesses in its new Museum an attraction for the educated tourist, the chief merits of which lies in its being decidedly local in character, and therefore unique. It is also of special interest, in that it exhibits Greek and Roman art under the influences of other races and other physical conditions than those of the two peninsulas.

* Seven mètres (23 ft.) seems a very convenient width for museum galleries. It allows of two deep showcases, one on either wall, and plenty of space for large architectural objects and monuments in the centre.

NOTES.

Coast Protection. THE recent report of the British Association Committee on changes in the sea-coast of the United Kingdom has contributed useful information upon this subject, but it does not bring us much nearer to a solution of the difficult problem involved in the provision of funds for inauguration of the necessary protective works. In some places where towns are threatened by the sea, there is no difficulty, as the cost of sea-walls, groynes, and other works is defrayed out of the rates. But there are long stretches of coast, where land is of so little value that its owners would rather lose a yard or two in width every year than pay anything for protection. People owning land behind owners in the front rank are naturally anxious that those on the frontier should take precautionary measures. It is always pleasant to keep a buffer between oneself and threatened danger, but less agreeable to pay for such a luxury. This is just the position of landowners in the background. They would like protection from future peril, but object to pay for the advantage of posterity. Owners in the front rank also want protection, and think Government should afford it free of cost. The whole situation bristles with difficulties. In the present day land is worth very little except for building purposes. The suggestion has been made that Government loans should be granted on the prospective value of land, so as to encourage owners to undertake coast protection works. This idea might be feasible in some parts, but, as we cannot expect the whole of our threatened coast-line to be converted into a continuous seaside resort, the suggestion is not likely to be of very material assistance.

South African Irrigation. THE latest contribution on this subject is to be found in a paper presented to the American Society of Civil Engineers by Mr. F. R. Johnson, who has had practical experience of irrigation, both as an engineer and as a farmer in Natal. This communication confirms the opinions expressed by more than one engineer, that hydraulic engineer-

ing is very inadequately performed by South African agriculturists. Ditches or "furrows" are made without levels, the procedure being to test the furrow as construction proceeds, by letting the water follow up the work. Consequently the fall is generally inadequate, and much silt is deposited at flood time. Many farms have small reservoirs for surface water, but successful storage works for irrigation are very scarce. Occasionally dams have been thrown across streams, but owing to deficient design and construction many of these have burst. Speaking generally, irrigation works on any considerable scale are practically unknown. In dealing with the future possibilities of irrigation, the author thinks that until the law is amended irrigation works on a large scale cannot be undertaken by private enterprise. This conclusion is the same as that previously formed by Sir William Willcocks, who recommended that all public streams should be proclaimed as State property, a course that would result in all irrigation works being carried out by the Government. In the opinion of Mr. Johnson, if irrigation be left wholly to private enterprise, the Government will eventually have to deal with the storage problem, as happened in the United States. It is much to be desired that prompt action should be taken upon the question of irrigation as a policy of drift will do much to delay the agricultural development of South Africa, and in addition will tend to create difficulties to be dealt with in the future.

Sunderland Harbour.

SATISFACTORY progress is being made with the harbour of refuge now in course of construction by the River Wear Commissioners. As Sunderland is one of the chief seats of the shipbuilding industry, and comes next to Southampton among the principal seaports of the United Kingdom, the new harbour is a work of considerable importance. The scheme, of which the estimated cost is more than half a million sterling, comprises the construction of two massive piers of granite and concrete, one on each side of the river. One of these piers, that on the Northern side, has recently been completed, the length being 2,800 ft., and the width 35 ft. for a distance of 2,000 ft., while for the last 800 ft. the width is 41 ft. The height of the pier above high-water level is 10 ft., and at the extreme end a circular head, built on a foundation 40 ft. below low water level, rises to a height of 18 ft. above high water level, making a total height of 72 ft. 6 in. Upon this structure a lighthouse of red and white granite has been erected, rising to a height of 54 ft. 6 in. from the pier head. The lighthouse is 31 ft. in diameter at the base, gradually reduced to 16 ft. at the summit; the lantern has a diameter of 10 ft., and the focal plane of the light is 83 ft. 6 in. above high water level. All the granite and concrete blocks used in the construction of the piers are made at works established by the Commissioners, where they are loaded upon waggons, and afterwards lifted into position on the site by 60-ton radial hydraulic cranes. Some idea of the character of the work may be gathered from the statement that the largest blocks used weigh 56 tons each. Operations are now being concentrated upon the southern pier. The final completion of the work will certainly be to improve the river, and to promote the prosperity of the town and port of Sunderland.

The Permeability of Concrete.

ALTHOUGH a great difference exists between the permeability and porosity of concrete, some people are apt to consider these qualities as being identical. One of the most complete series of investigations with regard to the permeability of concrete was that undertaken by M. Feret, at the Boulogne Laboratory of the Ponts et Chaussées. The experiments to which we refer occupied a period of about five years, and from them it appears that the porosity of cement mortar varies considerably, diminishing as the proportion of cement increases, and increasing as the size of the sand grains diminishes. Again, the permeability of mortar diminishes as the proportion of cement increases, but increases with the size of the sand grains. Here it will be seen that the conditions of permeability and porosity are by no means alike. The further difference is apparent that, while all mortars immersed in water will absorb liquid of volume practically equal to that of the calculated voids, there is a very great difference as regards permeability, and in general it seems that the most porous mortar is the least permeable, and vice versâ. According to M. Feret, the effect of the passage of water is to set free small particles of cement, bringing them to the surface, where they produce fine stalactites tending to solidify the mortar, and to form an exterior coating. A practical confirmation of M. Feret's experiments was shown some time ago in connexion with a concrete tunnel at Hartford, U.S.A., where a large quantity of stalactites and stalagmites formed on the surface. This growth was first regarded as a defect, but was allowed to remain by the engineer, and the tunnel proved to be absolutely impermeable, although built in a particularly damp situation. Other instances could be given confirming the results obtained by M. Feret, and it seems to be quite clearly proved that the permeability of cement mortar is not a consequence of porosity, and that it is, in fact, inversely proportional to porosity.

The Savoy Hotel Accident.

AT the inquest into the death of the workman who was killed on Friday last by the failure of a crane, it was ascertained that the mishap was primarily due to the shifting of the shoe carrying the mast. The shoe was not directly secured to the platform, but was supposed to be held in position by two guys. Consequently it is not altogether surprising that the mast should have broken away under the strain of work. Although the contractor's foreman considered the crane to be properly erected, he was of opinion that the accident was caused by the slipping of the shoe owing to the wetting of the platform by rain. This is a very natural conclusion, and no one will be likely to disagree with the view of the jury that the erection of the crane was improperly supervised. Those who have studied the characteristics of water know that under favourable conditions it is one of the most efficient lubricants at the disposal of the engineer.

Alterations at Blenheim.

CONSIDERABLE alterations are now being made to the grounds which lie before the main front of Blenheim Palace, with a view to a larger expanse of short turf and wider sweeps of drive. The well-known bridge by Sir William Chambers will presently lead to a larger and more dignified space, more in keeping with the bridge itself. But Blenheim Palace must be always an unsatisfactory building, for the good reason that Sir John Vanbrugh designed a palace instead of a house. No one can notice the so-called triumphal arch which the Duchess placed at the entrance by the little town of Woodstock as a memorial of the Duke without a smile. Both in character and situation it is a failure. The misfortune of erecting such palaces as Blenheim is that the expense of keeping them up is enormous, and they must often either be allowed to go to rack and ruin or be a heavy burden on a landed estate to the detriment of the dwellers in it. Fortunately, so far as Blenheim is concerned, this is not at present the case. But when we look at Blenheim or at Stowe as primarily English country mansions, we must feel that the architects of the eighteenth century were foiled when they came to the designing of these buildings. They were wanting in an appreciation of the needs of the future. But then again there was, as regards Blenheim, the "troublesome chiel" in the shape of the Duchess Sarah.

Kew Bridge.

ONE of the few recent fine days tempted us to an excursion to Kew, partly with the object of seeing the completed effect of the new bridge at Kew. No architect, we believe, has been employed on it, and the details are rather commonplace; but the simple and massive treatment of the work renders it much more agreeable to the eye than many more pretentious engineering works in which what is supposed to be "architectural effect" has been attempted. The iron lamp-standards are clumsy in design, but the massive granite arches, with no ornament except a low-relief panel at the centre of the bridge with a coat of arms, have a fine effect, and illustrate how difficult it is to spoil a stone arched bridge if you will only let its lines speak for themselves. It cannot, of course, be pretended that the new bridge has anything like the picturesque and graceful effect of the old one, but that effect arose partly from its practical defects; for a bridge with numerous narrow arches and a considerable gradient is much more dear to the eye of the artist than one with a few wide arches and a flatter gradient. That cannot be helped; but we certainly miss the graceful effect of the old open balustrade—a particularly well-designed one. We do not see why this effect at least might not have been preserved, instead of adopting the solid balustrade, which is so blank and heavy in effect by comparison.

Birkbeck School Art Exhibition.

THE Birkbeck School of Art has on exhibition the students' work for session 1902-3. The exhibits include a set of drawings in architectural design which in 1902 gained a

National silver medal, and other works awarded book prizes in the same year. The Annie Taverner Prize for painting a head from life has produced perhaps the most striking work of the Exhibition; the winning head, by Miss Lydia Bainbridge, being a piece of creditable water-colour in good tone, and painted with considerable power. The Garrould Prize—modelling a head from life—is won by Miss Maud Steggall with a well-modelled head in low-relief. Miss Elsie Neweh wins the Godwin Prize for a study of drapery on an antique figure, with a delightfully-drawn study. The Mason prize—a design for an entrance hall—has produced a rather indifferent set. The design by the winner—Mr. Jos. Ginsburgh—is the only one with any pretensions to serious architecture, and is designed with true architectural feeling, but is spoiled by a rather unhappy ceiling with a pediment decoration of landscape and peacocks, which seems rather out of scale. In the figure composition time sketches some decorative talent is evident. The Sketch Club landscape class is disappointing. In pen-and-ink work, some of the work shows merit—notably "The Wrestle in the Way-side Inn," by Mr. Monck. The painting on wood class only shows one piece of consequence, a head by Miss Beclenberg, which might have been successful but for the fact that it is an almost perfect imitation of wood inlay. The possibilities of water-colour on wood are considerable, and as a medium of expression ought to be rightly used, instead of relegating it to the position of imitating an entirely different art. In the decorative classes for wall papers and textiles some of the work is promising. The County Council Scholarship (40*l.*) is won by Mr. A. G. Richardson with a set of architectural designs and sketches fairly well drawn, but, in the case of the Clock Tower, decidedly weak in design. His Market Hall, however, is a creditable effort. Altogether, the Exhibition is somewhat disappointing.

The Parthenon Model, British Museum.

All who are familiar with the Elgin marble room at the British Museum will remember the large model of the Parthenon placed there, which is so useful in enabling the less instructed visitor to realise what was the general position and the architectural function of the separate fragments of sculpture which he sees around. It was only a few days ago, however, while accompanying some strangers through the collection, that we noticed that the frieze, perhaps the most remarkable portion of the Parthenon sculpture, is not indicated on the model, though all the other sculpture is sketched out in a recognisable manner. This is surely a serious defect in the model, especially in an educational point of view; the more so as the position of the frieze has a great effect on the architectural design, and it occurs in a position where the spectator ignorant of the subject would not expect to find it. In fact, the knowledge of the position of the frieze on the building is very important towards forming a right estimate of the intention and spirit of the sculpture itself. Cannot the representation of the frieze be now added to the model, and an important deficiency be thus repaired?

LETTER FROM PARIS.

The Academie des Beaux-Arts has awarded to M. Lefort, pupil of M. Paulin, the Chaudesaigues prize of 2,000 fr., with the object of enabling the holder of it to pursue his architectural studies for two years in Italy. The subject given to the competitors was Un Pavillon des Bains et d'Eaux Minérales.

Since the terrible catastrophe of the Couronnes Station, the Paris population has no longer the same enthusiasm as before for the Metropolitan Railway; a result mainly owing to the obvious carelessness of the Company which works the existing lines. A Committee has been appointed to draw up a whole programme of reforms, which, however, are very long in being carried out, if indeed they are ever really intended to be carried out at all. Demands have been made for a system of ventilating shafts, for additional exits, for an alteration in the present combustible material of the carriages, etc., but the public can see for itself that nothing is altered. There seems to be a force of inertia, both in the construction and the administration of the lines, which gives rise to much apprehension, and will be likely to injure the prospects of the additional lines, which nevertheless are being pushed on with activity, to the great impeding, for the present, of the ordinary street traffic. A new set of lines is actually in contemplation, and is undergoing the formalities of official inquiry. One, from the "Circulaire," No. 2, by the Trocadéro to the Porte St. Cloud; a second parting from line No. 8, to run from the Invalides to the Porte de Châtillon; the third, a prolongation of line No. 3 to either the Porte de Champerret, or the Porte d'Asnières; the fourth, from the Place Gambetta to the Place du Danube, connecting lines 3 and 7. It is to be hoped they will be laid out and worked so as to preclude further accidents.

As the Longchamps Races will soon finish, M. Girault will be able to push on with the completion of the new tribunes which he is carrying out on a plan which has the full approval both of the Municipal Council and of the Jockey Club. They consist of two pavilions, one for the State authorities and one for the members of the Jockey Club. The first will be twenty-five mètres long in the front elevation, with a large salon, forming a rotonda, and a monumental flight of steps in front which will give access at once to the vestibule and to two terraces and an open loggia towards the racecourse; the whole surmounted by a terrace and a belvedere. The Jockey Club Pavilion will be forty-eight mètres long, with an open arcade of nine bays, flanked to right and left by square towers surmounted by light balustrades. As soon as the autumn season is closed, M. Girault will also proceed with new public tribunes; and the whole of these graceful structures will be opened together next spring. M. Girault is also to commence shortly the architectural portion of the monument to Pasteur to be erected on the site of the artesian well at Breteuil, which in two months will cease to exist. M. Girault's design comprises a turfed bank, on which will be the surbase of the monument, of Carrara marble, supporting a sculptured group by Falguière. The monument will be inaugurated early in 1904. Early next year also will be inaugurated the monument to Alfred de Vigny, which is to be placed in the Luxembourg Garden, opposite to that of Leconte de Lisle. The sculptor, M. José de Charmoy, has represented the poet on a high square pedestal surrounded by figures recalling his principal works. The monument to Dumas fils, to be erected in the Place Malesherbes, opposite the Doré monument, is another memorial erection intended to be finished in the near future. M. St. Marceau is the sculptor, and the idea of the treatment is much the same as in the de Vigny monument—the figure of the poet on a pedestal which is surrounded by figures symbolical of his works; only in this case the pedestal will be cylindrical instead of square. Lastly, to finish with this list of monuments, the equestrian statue of Lafayette is eventually to be erected on the Cour du Carrousel, but so far it only exists in a model, which the sculptor, M. Bartlett, will be required to modify considerably before its final execution.

M. Pascal is actively engaged on the enlargement of the Bibliothèque Nationale, the shell of which is nearly completed on the side towards the Rue Colbert. M. Pascal proposes to restore various historic localities, notably the Cabinet du Roi and the Chambre de Richelieu, in this portion of the building, which will also be decorated with a series of busts of celebrated librarians and of the administrators and architects of the Bibliothèque Nationale.

The work is soon to be begun for the enlargement of the Pont de Bercy, rendered necessary by the passage of a branch of the Metropolitan Railway. The work will consist in the establishment of a steel viaduct by the side of the old bridge. The two roads will be separated by a high partition fence of steel framing.

At the Luxembourg M. Scellier de Gisors has been at work for some years over the restoration of different portions of the building. At present he is engaged on the repair of the façade to the Rue Vaugirard, especially at the principal entrance facing the Rue de Tournon. In the garden, at the Place du Bassin, there is to be erected a work by M. Pierre Roche, entitled "L'Effort," which was exhibited in the Salon of 1900. It represents Hercules removing the rocks and thus opening the source of the Alpheus. The principal figure is in lead; the rocks are to be constructed in brick covered with cement.

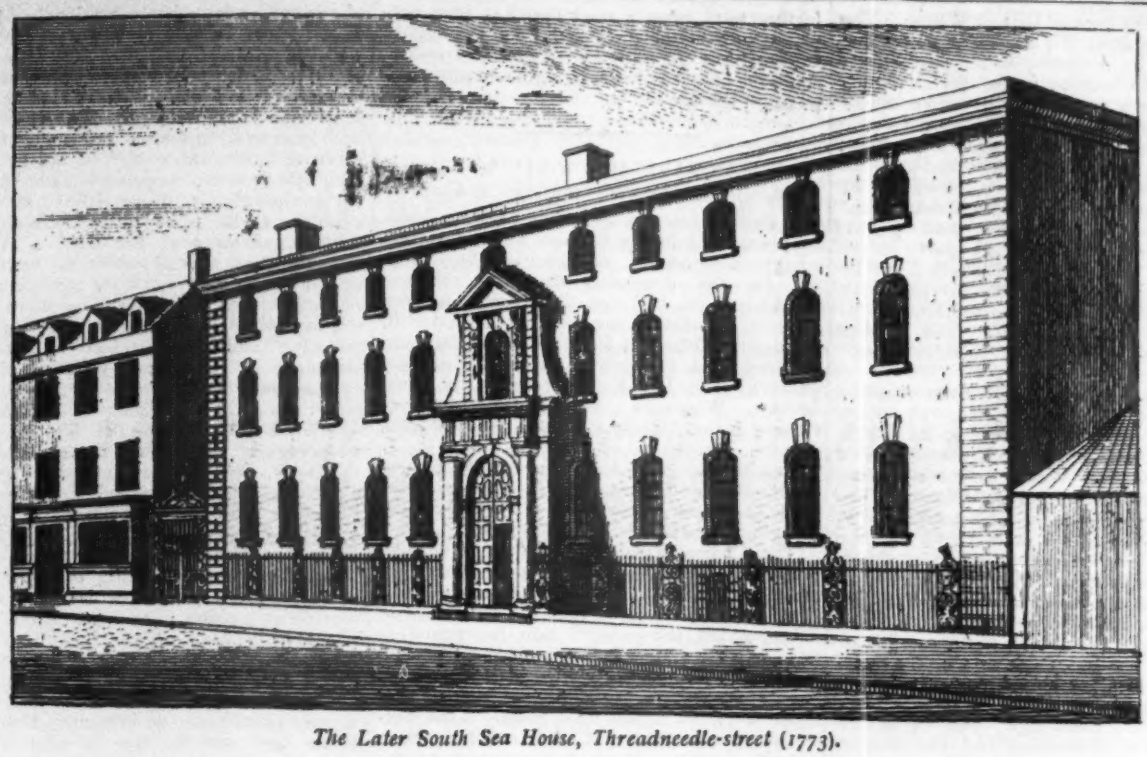
There is another old garden in Paris the existence of which appears to be threatened—that of the Hospice de la Salpétrière, which it is proposed to destroy in order to erect on the site a hospital which will replace at once the old Hotel Dieu and the Hçpital de la Pitié. The department of L'Assistance Publique has taken up this unfortunate proposal, which will not only be an act of vandalism but will hardly be beneficial to public health, in closing up such an open space with buildings, in what is already one of the least healthy quarters of Paris. The Vieux Paris Committee has accordingly put in a protest to the effect that, in any re-arrangement of the Paris hospitals, the gardens of the Salpétrière should be left untouched.

The new architect to the domain of St. Cloud, who is also architect to the Château de Rambouillet, is taking up in earnest the restoration and embellishment of the park of St. Cloud, which, since the war of 1870, has been in a lamentable state. The fine terrace of the Trocadéro, as it is called, has already been completely restored, as well as the old terrace of the palace, and basins of the fountains. Work of the same kind is now being carried out in the Jardin du Prince Impérial, and the restoration has been undertaken of the basins and canals, which form an uninterrupted perspective of *jets d'eau* beneath a complete tunnel of foliage. If we cannot again have the old palace, which was the finest work of Mansart, we can at least have the gardens as they existed before the *année terrible*.

At the Société Centrale des Architectes Français Mr. Aston Webb, R.A., the present President of the Institute of British Architects, has been elected a "Membre Correspondant."

We regret to have to record the death, at the age of seventy-one, of M. Eugene Train, Honorary Architect to the City of Paris. M. Train was a pupil of Jay and of Questel. He received medals in th Exhibitions of 1878 and 1889, and the Cross of the Legion of Honour in 1880. He had been a member of the Société Centrale since 1864, and had carried out numerous buildings, among which may be mentioned the Collège Chaptal and the Lycée Voltaire. He also designed the high altar of the Church of St. Augustin. Attached during half a century to the service of the Paris Municipality, he rose step by step by his own merits, without having ever demanded anything by favour. He was the first French architect who successfully employed ceramic and metal in the decorative treatment of an important building. The Collège Çhaptal is a good example of this.

Methodist Church, Netherfield.—The new Wesleyan Methodist Church, which has been erected at Netherfield, was recently opened. The edifice is built of brick with stone dressings, and a large carved stone pediment surmounts the front gable. The accommodation is for 609 worshippers, 311 on the ground floor and 270 in the gallery, which occupies three sides of the building. The choir and organ are placed in a recess, having pilasters with capitals and enriched arch. The ceiling is panelled and covered in plaster, with enriched ornamental work. In addition to the church proper there are vestries for the choir and minister, and there is a large band-room under the organ recess. The estimated cost of the church, inclusive of the site, will be about 3,600*l.* The architects of the work were Messrs. W. J. Morley and Son, of Bradford.



The Later South Sea House, Threadneedle-street (1773).

THE LATER SOUTH SEA HOUSE.

We publish this week an interior of the new British Linen Company's Bank, and in our issue of August 22 we gave an illustration of the exterior front to Threadneedle-street.

It may be of interest, as an example of the changes in City architecture, to give a representation of the old building, the later South Sea House, which was built at the latter end of the eighteenth century on the site where the new Linen Company's Bank now stands. The view is taken from an old engraving lent to us by Mr. Anderson, but which is not as old as the date of the building. It appears to be a fairly accurate copy of the engraving by Fougeron, from a drawing by S. Wale; the only difference in the representation being that in place of the hoarding on the right the older engraving shows a low building with a door, projecting somewhat beyond the frontage line of the South Sea House, and a row of curb-posts instead of the raised footwalk. Fougeron's is a better executed engraving than the one from which this illustration is taken, but we did not know of its existence until we looked into the history of the site.

The later South Sea House, afterwards occupied as the Baltic Exchange, was built, of red brick with stone dressings, on the north side of Threadneedle-street in 1772-3 (see Noorthouck's "History of London," 1773). The freehold was purchased for 55,700*l.* in 1856 by the members of the Baltic Exchange, and in 1900 was bought for 350,000*l.*, equivalent to 45*l.* 10s. 2d. per square foot, by the British Linen Company Bank of Edinburgh as the site of their new premises.

The South Sea House in Threadneedle-street is that which is familiar, by name at least, to readers of the first of the "Essays of Elia," for it was there that Charles Lamb, who likens it to Ossian's desolate Balclutha, had his first employment under his brother John, who was a clerk in the house.* The Baltic Society, a private association, formed by Baron Schröder, of merchants and brokers engaged mostly in the Russian grain, tallow, and other shipping trades, migrated thither after the pulling down of the "Baltic" coffee-house in Sweeting's-rents for the building of Tite's Royal Exchange, and subsequently acquired the freehold of the property. On May 22, 1894, were sold at auction, after their removal from the South Sea House, a set of portraits, life-size, of Kings George I-IV, and William IV, by Kneller and Allan Ramsay, and after Sir Thomas Lawrence, Sir Martin A. Shee, P.R.A., and Kneller. The pictures represented past Governors of the Bubble Company, founded in 1710 by Harley, Earl of Oxford, and Sir John Blunt. We should remind our readers, however, that the scene of that disastrous speculation of 1710-20 was not the building here illustrated, but the Old South Sea House at the rear, which fronted Old Broad-street, and had previously been used for the Excise. That house in Old Broad-street was built for himself by Sir William Cockaine, elected Lord Mayor in 1619. In his "Handbook of London" Cunningham says its site is unknown; but that is not so, for in the Parish Clerks' "New Remarks," 1732, will be found mention, under St. Peter-le-Poor (Old Broad-street) parish, of "a large house built by Alderman Cockaine, formerly the Excise Office and the South Sea Company's House." Moreover, Aubrey in his "Lives" says that Eliab, brother of Dr. William Harvey, the great physician, "bought about 1654 Cockaine House, now the Excise Office." The *earlier* South Sea House, and at one time the *old* Excise Office, was consumed by fire in 1826; most of its site was taken for the buildings of the City of London Club, 1833-4, designed by Philip Hardwick, R.A. The Baltic Exchange in Threadneedle-street was closed on Saturday, September 29, 1900, and the City Corporation effected a widening of the street by setting back the frontage at a cost of 14,400*l.*

* In a parcel of documents relating to the Bubble which are preserved in the Albert Museum, Exeter, is one bearing his signature—"Recd. 8th February, 1792, of the Honble. South Sea Company by the hands of their Secretary, Twelve pounds 1s. 6d. for 23 weeks attendance in the Examiner's Office. £12 1s. 6d. Charles Lamb."

THE ARCHITECTURAL ASSOCIATION SUMMER VISITS.

BATH CITY AND QUARRIES.

The concluding summer visit of a successful series was made on Saturday, the 26th ult., to the city of Bath and neighbourhood. The good results of the excursion to the Portland quarries last year suggested the present outing, which was divided between an examination of the Bath Stone Firms' quarries and an inspection of the principal buildings of this ancient town.

In fine weather an early start was made by a party of thirty members, including the President, Mr. H. T. Hare, in brakes kindly provided by the Bath Stone Firms. Mr. W. David, the general manager, together with other officials, accompanied the party, pointed out the various quarries, and gave much general information which added greatly to the interest of what was seen. In our issues of April 13 and 20, 1895, we gave an exhaustive account, with plans, diagrams, etc., showing the stone-producing areas of Bath stone, and full detailed information concerning the many kinds of rock produced. Practically the whole of this *great oolite* formation is quarried by a process of "mining." Sloping shafts or tunnels are bored until the fine beds are reached some 70 ft. to 100 ft. below the surface. These beds vary in thickness from 20 ft. to 30 ft., and lie between two strata of coarse shelly stone, unfit for building use, here termed the upper and lower rag beds. The top of the fine beds is first removed, and an examination made of the underside of the upper rag bed, which is to form the ceiling of the working. These workings or headings vary in width from 15 ft. to 35 ft., and any risk of the ceiling falling is met by means of timber strutting and wedging. The blocks are roughly squared as soon as quarried, and are swung on to trolleys or moved about by strong hand-power cranes. A large quantity of loose waste material thus accumulates, and is returned to the excavation, filling in about half of the depth of the freestone beds, and upon this made bottom are laid the tram lines. Trial holes are frequently sunk from the surface, and if the material be found satisfactory, headings are pushed out towards them. Lateral workings are also made, but in all cases piers are left to the extent of at least one third of excavated rock to carry the weight of the superincumbent mass. Air shafts, in addition to the sloping shafts or tunnels, provide ventilation, and all working operations are carried out with naked benzoline lamps.

At Box Station, the first halt, some large masons' shops and stacks of rough and dressed stones ready for dispatch were inspected; here, also, the quarry-man's markings and natural peculiarities by which the bed is identified, were fully described by the manager, who also gave information upon the packing and transit of worked stone. It was instructive to note that the whole of the material is sawn and dressed by hand, and that no machinery is employed for any purpose other than hoisting blocks from the mines.

At Corsham, two enormous stacks of stone in process of drying, and a sloping shaft with steam hauling gear, claimed much attention. Lunch was kindly provided here by the Bath Stone Firms, to whom a cordial vote of thanks, proposed briefly by the President, was accorded for their courtesy and hospitality. This concluded the first half of the day's proceedings.

Under the guidance of Mr. W. Mowbray Green, a tour was then made of the more important houses and public buildings in Bath, commencing with Prior Park. Situated high up on Coombe Down, the site of this house, now a Roman Catholic College, is remarkable for the extent and beauty of its view. By courtesy of the principal, access was obtained to the various rooms and to the old and new chapels in the college. Not the least interesting was the basement story, the whole of which is vaulted in stone. We illustrated and described these buildings, and many others in the city, on April 27, 1901. As the name suggests, a priory formerly existed upon the site, but the greater part of the Classic house now seen was built by the celebrated Ralph Allen in 1735-1743, who also erected the Palladian

Bridge upon the lines of that at Wilton. The purpose of this feature is difficult to determine, beyond being an ornament in the park, for it is placed in no relation to the surroundings, and spans but a small piece of water almost stagnant. Widcombe House and gardens were next seen, and proved thoroughly interesting. Entering the city, a good piece of modern work was passed in Fortt's factory, designed by Messrs. Silcock and Reay. The Roman Bath* naturally drew keen attention, and in due course Mr. Green conducted the party to the Pump Room and to the Guildhall (built by Baldwin, 1774-1777), and at all three places the additions and other works by the late J. M. Brydon were much admired. The Mineral Water Hospital and Beau Nash's house † were also visited.

From this point Mr. Green led the members to Queen-square, where the four elevations have a Classic treatment slightly varied. This forms part of a very extensive scheme carried out by the brothers Wood, embracing many streets, the Crescents, and the Circus. The houses have excellent plans, and good detail in staircases, ceilings, and other parts, but the whole was a kind of speculative undertaking, wherein the architects had an opportunity of producing a treatment of a uniform character throughout, and have succeeded. A noticeable point in the numerous effects is the small scale of the various features, together with the maintenance of a pleasing consistency throughout. Modern speculators appear to be blind to the lessons of Bath, Edinburgh, and eighteenth century work of other cities, and, moreover, it is also apparent in Bath that the Georgian tradition has very little, if any, influence on the modern work of the town.

After accepting Mr. Green's welcome hospitality, a hearty vote of thanks was given him for his valuable assistance and leadership. Thus ended a profitable, although a lengthy, day's sightseeing.

DUSTLESS ROADS.

At the present time, when we are promised a further investigation into the great dust question, it may be useful to revert to the subject of oiled roads. Although the experiments made last year in this country were not followed by permanently successful results, we believe it probable that this is due to inexperience, and that the failure recorded should not be put down to the fault of the system. In California, where the practice of treating roads with oil was first applied, various precautions are taken with the view of insuring success. When a road is to be oiled it is carefully prepared, particular attention being devoted to drainage; and although the covering when finally made is impervious to water, it will lose firmness and break up if the foundation is water soaked. Again, after the road surface has been shaped, it should be well-sprinkled and rolled to insure uniform consistency and a firm foundation. The next step is to run a sharp-toothed harrow over the road so as to loosen the surface to a depth of 3 in., the aim being to form an oil-crust of that thickness. If the surface be too hard for the use of a harrow, the practice is to build it up by adding material after the oil has been applied. A very important point is to keep traffic off the new surface until it has hardened, and if it is not possible to close the road entirely, one half should be treated at a time. The oil is preferably applied hot, by the aid of a suitable plant, and a thin coating of sand should be spread over the road to absorb oil that does not sink into the surface. Two, and sometimes three, coatings are necessary during a season to obtain the required oil crust, and repairs must not be neglected.

The experiments made at Farnborough were evidently not carried out with sufficient thoroughness. A thin crust was formed that lasted during dry weather, but was not adequate to resist the conditions prevailing during the winter season.

If proper precautions had been taken, and all essentials had been duly complied with, it is highly probable that very different results would have been attained. As things stand, people seem to think that the oiled road is impracticable in Great Britain, simply because a half-hearted and incomplete attempt resulted in failure. That is the natural and fitting end of all bad work, and we now want further tests upon a road that has been prepared with suitable oil and in a thoroughly workmanlike manner, by people who understand the proper way of setting about and completing their work.

* See the *Builder*, October 23, 1897, and May 25, 1895.
† Ibid., October 31, 1896.

THE SANITARY INSTITUTE.

MODERN METHODS OF TREATING SEWAGE.

A Provincial Session of the Sanitary Institute was held in the Lecture Theatre of Birmingham University on Saturday, September 26, for the discussion of some practical considerations in connexion with modern methods of treating sewage. Dr. Alfred Hill, ex-Medical Officer of Health for Birmingham, presided, and there were present Professor Bostock Hill, Dr. Reid, Stafford, Dr. Fosbrooke, Worcester, Dr. Rideal, London, Colonel Jones, Aldershot, Messrs. White Wallis, London, Secretary of the Institute, J. T. Eayrs, Birmingham, local Honorary Secretary, Scott Moncrieff, London, A. Creer, York, S. R. Lowcock, London, J. E. Willcox, Birmingham, and others.

The Chairman said the subject of sewage treatment was important to their health, to their pockets, and as regarded the command of land. He remembered that the conditions in Birmingham thirty years ago in regard to sewage treatment were horrible, but he thought when they visited the works at Tyburn they would see much to admire in the present system. What struck most people in the bacterial system was that they could by such simple means eat up a great part of the sludge in the sewage. But there was nothing new under the sun. Nature had been carrying this out under their noses for all time, but they had not been observant enough to see it. They were now trying to imitate Nature's own processes by scientific means.

Professor Bostock Hill, M.Sc., M.D., then opened a discussion on some practical considerations in connexion with modern methods of treating sewage. He said that although they now knew so much of the scientific principles underlying the purification of sewage, when they considered the condition of many of the rivers it was not surprising the subject should still retain a peculiar interest. Although it was little more than ten years since the science of bacteriology became paramount among those concerned in the treatment of sewage, practically it might be said that the modern methods had eliminated all the older ones, such as precipitation, with the countless number of precipitants urged as desirable at one time or another, and practically by modern methods they meant either treatment on land or by bacterial means. Dealing first of all with the treatment of sewage on land, few new points had arisen of late, but in the last few years they had gained certain fresh experience. For instance, they knew that land treatment was absolutely useless unless the proper sort of land could be obtained, and in sufficient quantity. In many land treatment systems the sludge was treated on the land. This was a mistake, for as it contained little manurial matter, and in the case of large towns, a good deal of chemical matter, it was far better to get it taken away as far as possible, and distributed on other lands. There was no doubt that land, if it could be obtained of proper quality and in sufficient quantity, was a perfectly valid method of dealing with sewage, and excellent results were obtained; but, on the other hand, bad results were often obtained, as the various actions in the courts of law had shown. One great trouble was storm water, and personally he was of opinion that in many cases economy would result from treating the dry weather flow by bacterial methods, and utilising the land for storm water. The great advantage of this was that the land could be practically returned to agricultural uses. Coming to a consideration of bacterial methods, it was no exaggeration to say that one thing was now definitely proved, viz., that properly carried out, and with a due regard to scientific knowledge, this was a perfectly valid method of dealing with sewage in large or small quantities. There were several plans of treating sewage bacterially, and unhappily each was apt to think that the one they had experience of was the best under all circumstances. This was not so, and the experiences of the last few years had conclusively shown that the systems which would satisfactorily treat the sewage of one district were quite unfitted for the treatment of another class of sewage under other conditions. At present there might be said to be three methods of working bacterial systems. The first was the septic tank, followed by filtration through contact beds. The second, the use of coarse and fine, or so-called anærobic and ærobic filters, both contact. Attention had particularly been given of late to the system by means of which they first removed suspended matter by chemical precipitation, and then filtered through fine ærobic beds, or, as it had been termed, "intermittent continuous filtration." All these systems under special conditions were capable of doing excellent work, of purifying sewage to such an extent that the resultant effluents might be discharged as practically non-polluting and non-putrefactive into ordinary streams. In considering which of them was best adapted for any set of circumstances, they had to bear in mind many important points, notably the quality of the sewage, the surroundings of the works, the available fall in the land, and the stream into which the effluent was finally to pass. In many respects the septic tank was the simplest to work. As regarded coarse and fine filters, the main points experience had brought to light were the absolute importance of putting the sewage on to coarse beds as free from inorganic suspended matter as possible. As regards the material, it should be hard and as smooth as possible. Any material which broke down was unsuitable. As regarded the final anærobic or oxidising filter, there was no doubt that the intermittent continuous, or streaming filter, was the best. This was the type of filter which had come to stay. It was only fair to say that it required more care and observation than the contact bed, and it required to be deeper, but he had not the least doubt that both from a theoretical consideration and practical results, it was undoubtedly the best. As regarded the filtering material, though good results could be obtained with almost any hard material, he believed that coal was still the best, as it produced an effluent of high-class quality. Granite chippings were also excellent. As regarded the size of the particles, he believed ½ in., with a few inches of fine material on the top of the filter, gave the most satisfactory results.

Mr. J. E. Willcox, A.M.I.C.E., of Birmingham, in a paper on the subject of the modern treatment of sewage, dealt first with the general principles underlying modern methods of sewage disposal. General principles being established and understood, it would be conceded that good results must largely depend on overcoming the practical difficulties which arise in connexion with the design and construction of works. It was impossible to deal successfully and economically with all classes of sewage by similar methods, regardless of conditions obtaining in each case. The first consideration was the volume and character of the sewage to be treated, and the standard of purity required. Though a standard of purity was very desirable from an engineering point of view, the difficulty of fixing one was very great owing to the different conditions of the sewage of various towns. The requirements of the Local Government Board with respect to provision for dealing with six times the dry weather flow were excessive, and was proved by the results of various gaugings extending over long periods of time. He next dealt with the reason for the divergence of volume, and also rates of flow, and the effect that area and configuration of districts sewered had on this point and on pollution of streams by storm overflows; also as to how the volume and character of sewage was affected by combined or separate systems, and trade wastes and the rates of flow, for which provision must be made both for gravitation schemes and pumping schemes, and the effect of varying rates of flow on the design of the tank and filters. Treatment in tanks he regarded as a necessary preliminary to all methods of treatment. He then proceeded to the consideration of the construction of detritus tanks and screening chambers. He regarded the over screening of domestic sewage as undesirable, and referred to the removal of silt from chambers. The design of settling tanks and septic tanks, methods for preserving scum if required, and the drawing off of sludge from septic tanks, over-septicised sewage, and excessive accumulations of scum were then dealt with. He dealt with the difficulty met with by reason of excessive scum in the septic tank, and the offensive nature of the septic tank effluent, and the effect upon such effluents when flowing in closed pipes, with the arrangements for draw-

ing off sludge from septic tanks. He then proceeded to refer to land treatment, and dwelt upon the impracticability of taking a basis of so many persons per acre in considering land schemes. The basis of acreage should be the number of gallons per acre, depending on the character of the land and the nature of the sewage. He then dealt with the bacteria system, and pointed out that as the final treatment consisted, as was admitted, in aeration and nitrification, this must depend largely upon the intimacy of contact between the sewage and the air. In his opinion, percolating filters were to be preferred in many cases to contact beds, and where the latter were used the effect of size of particles on the contact bed effluents, and the means of distribution over the beds, should be carefully considered. The question of the sludging up of contact beds was a matter of much importance, and there should be care taken in avoiding the use of materials which were likely to disintegrate and choke up the beds. The question of distribution on streaming filters was next dealt with, together with the difficulties which occur in connexion with obtaining an even distribution of the sewage over the filters. Natural means by which contact or filter beds are aerated, and remarks as to the varying factors of discharge. In conclusion, Mr. Willcox referred to the large experiments with power-driven distributors on half-acre filters, with varying size particles, now being carried out by himself at Hanley in conjunction with Dr. Reid, the Medical Officer for Staffordshire.

Dr. Rideal, London, thought they had a very good object lesson from the Birmingham experiments of what should be the size of septic tanks. The total volume of the Birmingham sewage was 25,000,000 gallons, and the capacity for intercepting the solids was only about half the dry-weather flow. The effect of that was that in the last two years there were about 24 grains of suspended matter in the liquid which came out of the tanks. That quantity was very high indeed. In Birmingham when there was chemical precipitation there were only about 4 or 5 grains of suspended matter. A good septic tank working should not give more than about 10 grains. Another point was as to the distribution of the sewage on the filters. If they could increase the flow of the filters by 10 per cent. by the use of an efficient distributor, it would pay for any additional outlay on distribution.

Dr. Reid, Medical Officer for Staffordshire, was glad to find that both Dr. Hill and Mr. Willcox agreed that filtration was better than contact. He thought it was a great mistake they had ever heard of contact; if they had not they would have heard more of efficient distribution and efficient filters. They must blame the engineering world for accepting Mr. Dibdin's suggestions, and recommending authorities all over the country to lay down contact beds, a policy which he thought they would regret. The experiments with filtration at Hanley proved that they could obtain good results without going down to the very smallest sizes of material. The best size was ¼ in., rejected by ⅛ in.

Dr. Fosbrooke, Medical Officer for Worcestershire, said the Worcestershire County Council had laid down at Malvern a series of tanks, septic tanks with continuous filtration, with contact beds, and with streaming or intermittent filters. Four different kinds of material had been used—coal, coke, bricks, and local stone. Shortly, the results of the experiments had been that the septic tank with continuous filtration had given the best effluent, and the contact beds had not reached the high standard of purification once expected. Personally, he shared the opinion that the contact bed was dead, or, if not dead, dying. He thought coke was the best material for the filters.

Mr. Sidney R. Lowcock, Birmingham, said there was one point in connexion with the Malvern experiments—that was that the sewage was taken from the main sewer as it came down to the works. Therefore, they got it at the different rates of flow, as was the case with an ordinary sewage works. His name had been associated with filters, and he was very glad they were all coming round to his way of thinking that the filter bed was a great deal better than the contact bed. He came to that conclusion as long ago as 1890, and expressed it in a paper read to the Institution of Civil Engineers. At that time he had an idea that it would be possible to work the filters continuously. He had since come to the conclusion that he was wrong, and that they must work them intermittently. With reference to the use of automatic machinery, he did not believe it possible to have automatic machinery that would work satisfactorily under all the varying conditions of sewage disposal works. The quality and the quantity of the sewage continually varied, and the whole secret of success or failure depended upon intelligent scientific supervision.

Mr. J. S. Pickering, Cheltenham, said that having had a fair experience of material for bacteria beds, he had come to the conclusion that it was a mistake to employ coke or any material which was likely to disintegrate. He was quite sure where coke was adopted there would be a difficulty in the silting up of the beds. He thought it would be necessary to convey all septic tank effluents by closed channels to the contact beds or filters, owing to the nuisance of smell. He would like to bear out what Mr. Lowcock had said as to how unnecessary it was to have automatic gear to save the wages of two or three labourers.

Colonel Jones, Engineer of the War Office Sewage Farm at Aldershot, said the whole success or failure of contact beds and streaming filters depended upon the character of the liquid sent forward from the septic tank. If the liquid contained much suspended matter, it would choke up the contact bed or filter. Suspended matter might be of two kinds, organic and inorganic. In his opinion it was not right to retain anything but inorganic matter, because no microbes had a taste for anything of the kind. In many cases it was usual to keep out everything, whether mineral or organic matter. He had been at the subject for the last thirty or thirty-five years, and he congratulated them on coming round to his idea of land treatment.

Mr. A. J. Martin, London, said, with reference to the so-called offensive character of the liquid and sludge from the septic tank, he would remind them that Mr. Watson had said in a recent article that this was largely a matter of the way in which they conducted the liquid from the tank. One reason why septic tanks had been found so offensive was owing to the practice of having small tanks, and removing from them large quantities of material only partially digested and in an active state of putrescence. If they had the tanks large enough to bring about full putrescence, they would get a residuum less in volume, which could be dealt with without any nuisance. He was saddened to hear Dr. Fosbrooke say the contact bed was dead or dying. Four or five years ago it was said the septic tank was dying, but it was to-day in a healthy state of convalescence, and he predicted that four or five years hence the contact bed would be in an equally healthy state of convalescence. He dissented from Mr. Pickering's remark that the use of automatic apparatus was to save two or three labourers' wages. The reason was because the reliability and efficiency of automatic gear such as they had at Leeds or Exeter gave results such as could not be obtained by any manual labour that would be available this side of the millennium.

Mr. Scott Moncrieff, London, thought a meeting such as that ought to be utilised for taking the public into their confidence, and letting them know how they stood in reference to these expensive matters of sewage purification. There was a general opinion abroad that land was the proper method of treatment. All he had to say upon that was that theoretically that might be perfectly true, but practically all of them were agreed that nine-tenths of the land in England was unsuitable for carrying it out. The next thing was that land not being available, could they so concentrate the methods of nature that the solution of the problem could be carried out completely?

Mr. O'Shaughnessy, Birmingham, supported the opinion of Dr. Bostock Hill that coal was the best filtering media. He had tested it alongside other materials, and the difference in favour of coal was simply enormous.

Dr. Barwise, Birmingham, thought a vigorous protest ought to be made against any proposal that sewage effluent should be bacteriologically treated, because there was an idea that the Royal Commission intended to set up a bacterial standard of purification. It was not the duty of a Sanitary Authority to turn its sewage into a drinking water, but the duty of water authorities to take their supplies from unimpeachable sources.

The afternoon was devoted to a visit to the Birmingham Sewage Disposal Works, over which the visitors were conducted by Mr. Watson, the Chief Engineer.

ARCHITECTURAL SOCIETIES.

Manchester Society of Architects.—On September 19 the members of this Society visited some recent buildings at Alderley. Mr. McConnel's house (Messrs. Thomas Worthington and Son, architects) was the principal building visited, with its picturesque white-washed and stone-slated exterior, and very charming interior. A fireplace, with green tiles, beaten brass work, and bosses of green enamel, attracted much attention. The same architect's house for Mr. Agnew, a brick and stone building, contained much of interest. Mr. Alex. Graham's Epileptic Homes at Sandlebridge, now approaching completion, were an interesting study of a novel type of building, in which the planning and all practical details have evidently been worked out with the greatest care and skill. The growing darkness prevented more than a hasty glance at Messrs. Worthington and Sons' Convalescent Home, but this showed that when completed it will make a very good group of simple character.

Devon and Exeter Architectural Society.—On Saturday, the 26th ult., the members of the Devon and Exeter Architectural Society made an excursion to Dartmouth to visit the new Naval College buildings now in course of erection. The President (Mr. A. S. Parker, A.R.I.B.A., of Plymouth) entertained the party to luncheon, among those present being Mr. Aston Webb, R.A., President of the Institute of Architects, and also the contractor for the new college, Mr. Hill, of the firm of Higgs and Hill, London, Mr. Wallis, clerk of the works, and Mr. Hill, Admiralty clerk of the works. The President (Mr. Parker) proposed "The Royal Institute of British Architects," coupling with it the name of its president, Mr. Aston Webb, R.A. From the time of its foundation in the reign of William IV., and for the greater half of the reign of Queen Victoria (who graciously granted it two charters), the Institute, he said, notwithstanding the prefix of the word British, remained largely as a Metropolitan society, in which provincial architects had but little share; but during the latter end of the century the policy of the Institute expanded on something like the Imperial lines of the nation, so that to-day the Institute had seventeen allied societies in Great Britain and the colonies, of which the Devon and Exeter Society has the honour of being one. He would not attempt on such an occasion as that any enlargement of the subject of the Parliamentary registration of architects, but he believed that a large section of provincial architects held that even an imperfect Bill would be better than no Bill at all, inasmuch as a compulsory examination and registration would promote improved education amongst those entering the profession in a manner in which no other method could produce. They welcomed Mr. Aston Webb's presence, not only because he was the President of the R.I.B.A., and not only because he was the architect for the Royal Naval College, but because he was an architect whose abilities they had long recognised as placing him amongst the very foremost of modern artists. His star had continued to ascend for very many years, and one might be pardoned for prophesying that it had not yet reached its zenith. They had had the advantage of seeing the actual work or the drawings of a long list of public and national buildings, not the least of which was the great architectural scheme of the national and Imperial memorial to Queen Victoria. But a wonderful evidence of Mr. Aston Webb's reputation occurred by its even penetrating the Government official mind. He believed it took an extraordinary reputation to convince a Government official that there was better ability outside than in. Hence the fortunate selection of Mr. Aston Webb as the architect for the Dartmouth Naval College. Mr. Aston Webb, responding, expressed his pleasure at being honoured by that Society of visiting one of his buildings. In about a month it would be his duty to deliver the annual address to the Institute, and as he had been devoting serious thought to several matters, among them being education and registration, he would not enter into them to-day, but would ask the members to be so kind as to read the report, and give their careful consideration to these important questions. The Institute was not merely a London society, but intended equally for the advantage of the provinces as for London. Under the guidance of Mr. Aston Webb, the new Naval College was then inspected. From a large plan Mr. Webb described the general scheme and the purposes to which the various

sections were appropriated. The main buildings, to cost upwards of 400,000*l.*, were generally at the roof level, and one of the wing towers is erected, but the central portion, which includes a dominating tower, is not up to its height. Wide-jointed red bricks, with Portland stone dressings, give a warmth to the composition, the main façade being about 700 ft. long. The accommodation is for about 300 cadets, with quarters for officers and staff, and a residence for the captain. The power station for generating steam and electricity, also pumping purposes, is at the river level, so that the 150-ft. chimney is not an eyesore to the college. On the higher ground to the west, and near the extensive playing fields, is the hospital, this being the only portion at present occupied, and over this the visitors were conducted by the Captain of the *Britannia*.

Illustrations.

THE BRITISH LINEN COMPANY BANK, THREADNEEDLE-STREET.

WE give a view of the interior of this bank, of which we published a plan and view of the exterior on August 22.

The walls of the banking chamber are lined throughout with pavonazzo marble between the dado and the entablature. The die of the dado is in verde-antique, the base and surbase being in grand antique marble. The columns and pilasters are in St. Ambrozia Verona marble, with white alabaster caps and bases. The entablature is in coloured alabaster. The walls of the managers' and directors' rooms are lined with white alabaster, all done by Messrs. Farmer and Brindley. The floor of the banking chamber is in marble mosaic by Messrs. Burke and Co. The ceilings throughout are in faience by the Burmantofts Works. The screens and fittings throughout are in mahogany. The whole interior is therefore finished in polished materials, dispensing with the necessity for periodical painting.

As before stated, Mr. J. Macvicar Anderson is the architect.

COMPETITION DESIGN FOR LIVERPOOL CATHEDRAL: INTERIOR.

WE gave last week the exterior view and plan of Mr. Corlette's design for Liverpool Cathedral. We give this week a view of the interior as proposed.

The author's intention in the design was described in our last issue.

VILLAGE CROSS, WEST MEON.

WE publish this week an illustration (the original of which was in this year's Royal Academy) of a village cross which has been presented to the inhabitants of West Meon, in Hampshire, by the Rev. R. N. Gandy. An ancient wooden cross formerly stood on a triangular piece of ground (known as the Cross) in the centre of the village, and portions of it were in existence till 1644, but in that year the troops of General Walker totally destroyed it. A new cross of Portland stone has now been erected on the same site by Mr. Gandy in memory of the late Dr. and Mrs. Rogers. Its height is 18 ft. The work was executed by Messrs. Farmer and Brindley, the local builder being Mr. Walter Read, of West Meon.

The architect is Mr. C. Harrison Townsend.

PROPOSED SEASIDE CONVALESCENT HOME.

THIS drawing shows the original design for the building; in execution it was considerably modified both in plan and elevation.

The materials proposed to be used in its erection were red-brick facings for the ground floor story, with tinted cement rough-cast above, Broseley tiles being used for the roofs and vertical tiling bay.

The principal rooms and dormitories for the patients were to have coloured glazed-brick high dadoes, with distempered plastering above, the angles with ceiling being coved, and all angles rounded, the floors of rooms throughout paved with pitch-pine block flooring, and the corridors and sanitary blocks with Venetian mosaic paving, the walls of latter being faced throughout with glazed bricks.

Messrs. Cheston and Perkin are the architects.

BILLIARD-ROOM, CLEWER PARK.

THIS room was erected for the late Sir Henry Gooch, Bart., some years ago. The whole of the joinery is executed in oak, wax-polished, the ceiling being formed with moulded oak beams with plaster panels between.

The fireplace recess was ceiled elliptically with decorated plaster work in low relief. The floor was laid with solid oak blocks to design on concrete, and wax-polished.

The cost of the room was about 2,000*l.*

Messrs. Cheston and Perkin are the architects.

COMPETITIONS.

STONEHAVEN: ADDITIONS TO TOWN HALL.—The design of Messrs. D. and J. R. Macmillan, Union-street, Aberdeen, has been accepted.

ENGINEERING SOCIETIES.

THE JUNIOR INSTITUTION OF ENGINEERS.—Mr. J. Fletcher Moulton, K.C., M.P., F.R.S., has been elected President of this Institution in succession to Colonel Edward Raban.

LONDON BUILDING ACT, 1894.

QUESTION OF FIRE-RESISTING ROOFS.

THE Tribunal of Appeal under the London Building Act, 1894, sat at the Surveyors' Institution on Friday last, 25th ult., to hear an appeal by Messrs. Whittington, Son, and Barham, on behalf of the City of London College, under Sect. 78 and 79 of the Act, against the determination and requirements of Mr. Edmund Woodthorpe, district surveyor, by his letter to Mr. Edward Street, the appellants' architect, refusing to sanction the alteration and adaptation of 9, Ropemaker-street, to the purposes of the City of London College, and alterations in the premises situate at 7, White-street, as not complying with the provisions of Sect. 68, 77, Subsect. 2, 79 and 80, Sub-sects. (*a*), (*b*), (*c*), (*d*), and (*e*) of the Act; and with certain further requirements, viz.: that the roof of 9, Ropemaker-street should be made fire-resisting throughout.

The members of the Tribunal sitting were Messrs. J. W. Penfold (chairman), A. A. Hudson, and E. A. Gruning.

The appellants were represented by Mr. Sidney Humphreys, barrister, and Principal of the College, and the London County Council by Mr. Andrews, of the Solicitor's Department.

Mr. Humphreys explained that the City of London College, 7, White-street, was erected in 1883 for the purpose of teaching, mainly by means of classes and lectures, for commercial subjects and science and art. In 1894 the accommodation was found to be insufficient, and No. 8, White-street was taken over and connected with a bridge across White's-court, which intervened. Both buildings satisfied the requirements of the Acts then in force. Now it was found necessary to still further extend the College, having in view work of a higher character in commercial work and developments in the present work. It was therefore proposed to convert No. 9, Ropemaker-street, from a vacant warehouse into an addition to the College, the sum to be expended being 18,000*l.* The District Surveyor objected to the construction of the roof of the building proposed to be converted, holding that the roof should be made fire-resisting throughout. He also objected because the staircases were not shown in the building proposed to be converted, in accordance with Section 80, especially Sub-sections (*d*) and (*e*). He objected, too, to the uniting of the present City of London College to the building proposed to be converted, because the buildings, when united and considered as one building only would not be in conformity with Sections 68, 79, and 80. The District Surveyor argued that there might be danger to the lives of the students from a sudden fire occurring in the College building or in that adjoining. In recent years, he declared, there had been many large fires in the immediate neighbourhood. The danger in the upper part of No. 8, White-street, and in the upper part of the building at the corner of White-street and Finsbury-street from a sudden fire might, so the District Surveyor pointed out, be very considerable, and these floors were nearly all constructed of wood, with wooden partitions and match-lining even in the roofs, and the one and only staircase in No. 8, White-street, was of wood, and enclosed with wooden partition only, and separated in no way from the warehouse below except by a wood floor and partition.

Commenting on these objections, Mr. Humphreys said the plans showed that the roof would retain the old principals, and there was no objection to doing what the Tribunal might ask regarding it, but it was quite unnecessary to substitute fire-resisting materials. The grounds upon which the appellants appealed therefore were: (1) That the proposed construction and arrangement of the building are such as to render a fire-resisting roof throughout unnecessary; (2) that the buildings 7, White-street, and 9, Ropemaker-street are not and will not be buildings within Sect. 80 of the London Building Act, 1894; (3) that the staircases shown in the building proposed to be converted are in accordance with Sect. 80, Rule (*a*); (4) that the total numbers of students to be accommodated are such as do not bring the building within Sect. 80, Rule (*c*); (5) that no part of the existing or extended building is used or intended or adapted to be used for the public; (6) that the premises of the College situate in White-street were erected before the passing of the London Building Act, 1894, and are erected or constructed in compliance with the provisions of that Act; (7) that the present College and the building proposed to be converted, if altered and converted according to the plans deposited, and united and considered as one building only, will be in conformity with the London Building Act, 1894; (8) that the uses to which the buildings will be put and the work proposed to be carried on within them are such as to render the risk of fire infinitely small, that the buildings are separated from buildings in the immediate neighbourhood so as to preclude any fire risk from them, that the persons using the buildings will be adults, not more than 20 per cent. of whom will be women, and there will be no congested assembly of persons within the building, and that generally there is no danger to those using the premises in case of sudden fire; (9) that the part of the building referred to as No. 8, White-street, was adapted to be used by the appellants in 1894, and the construction approved by the authorities having authority to approve the same, and it is in conformity with the London Building Act, 1894; (10) that the premises known as No. 8, White-street, do not form part of the building which it is proposed to unite with No. 9, Ropemaker-street.

The Tribunal heard the evidence of Mr. Street, and then advised the parties to confer on the points in dispute, and suggested that the claim for a corridor should be dropped.

After an interval, it was intimated by Mr. Humphreys that the appellants withdrew their appeal so far as the corridor was concerned, and consented to an adjournment on other points.

The precise terms of the agreement arrived at were these:—"The appellants withdraw their appeal in so far as it applies to the corridor communication between No. 7, White-street, and the building No. 9, Ropemaker-street. The hearing is adjourned to enabled the parties to agree upon a second means of escape from No. 9, Ropemaker-street, and to agree upon the requirements necessary to make the building fire-resisting, with liberty to apply."

Further, it was agreed between the parties that the floors, between the existing joists, are to be filled with coke breeze concrete 5 in. thick, supported by angle iron fillets secured to the sides of the joists, with plastered ceilings. Roof: The interstices between the rafters to be filled with coke-breeze concrete 5 in. thick, and the under side of the rafters to be plastered on expanded metal lathing. Staircase to be constructed as shown on the plans. Escape: That an opening be cut in the south external wall of No. 9, Ropemaker-street. A teak door to be hung in the opening to open outwards, as described for doors under the Factory Act. That a metal bridge be constructed from this opening across the roof of No. 7, White-street, to the south-west corner thereof. At the corner the staircase of No. 7, White-street is to be continued up to the roof—a detail of these stairs and the opening therefrom to the roof be prepared and agreed upon, and to form part of the Order of the Tribunal. The doors at the foot of these stairs next the street to comply, as before, with the Factory Act.

Correspondence.

SIZES OF GLAZED BRICKS.

SIR,—I was indeed pleased to read the remarks in last week's issue on glazed bricks and their sizes. It has always been beyond my comprehension why they have been tolerated by the scientific world so long. We read in most of our technical books the necessity of joints in brickwork being a uniform thickness to prevent unequal settlement. Mr. Mitchell writes in his book on building construction the following paragraph:—"Bedding of Bricks": "Bricks are bedded in mortar; first, to distribute the pressure more evenly over the bricks; secondly, to obtain adhesion, and thus give homogeneity to the mass; thirdly, by filling up the interstices, to make the walls weather-proof." If anyone has watched the bricklayer in his task of laying these bricks, he will observe how futile are his efforts to carry these remarks into

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INTERIOR, BRITISH LINEN COMPANY'S BANK, THREADNEEDLE STREET.—Mr. J. Macvicar Anderson, F.R.I.B.A., Architect.

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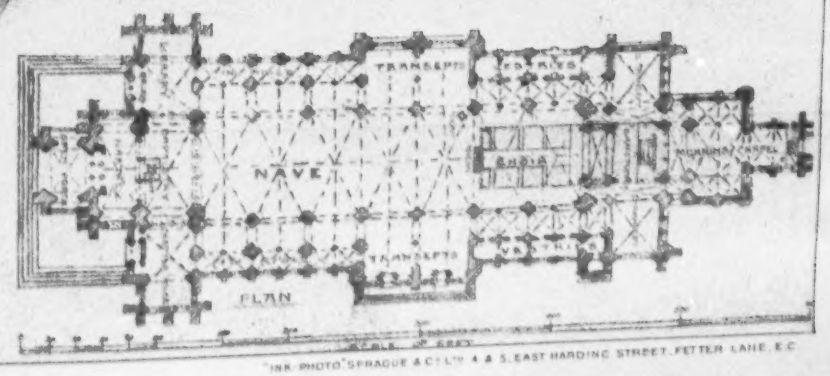
CATHEDRAL CHURCH OF ST JOHN

LIVERPOOL CATHEDRAL COMPETITION

DESIGN AWARDED "HONORABLE MENTION"

Herbert C. Corlette jnr. (C. 9 R. 2d)
(Nicholas Corlette)
2 Mecklenburgh Square
London W.C.

June 1902.



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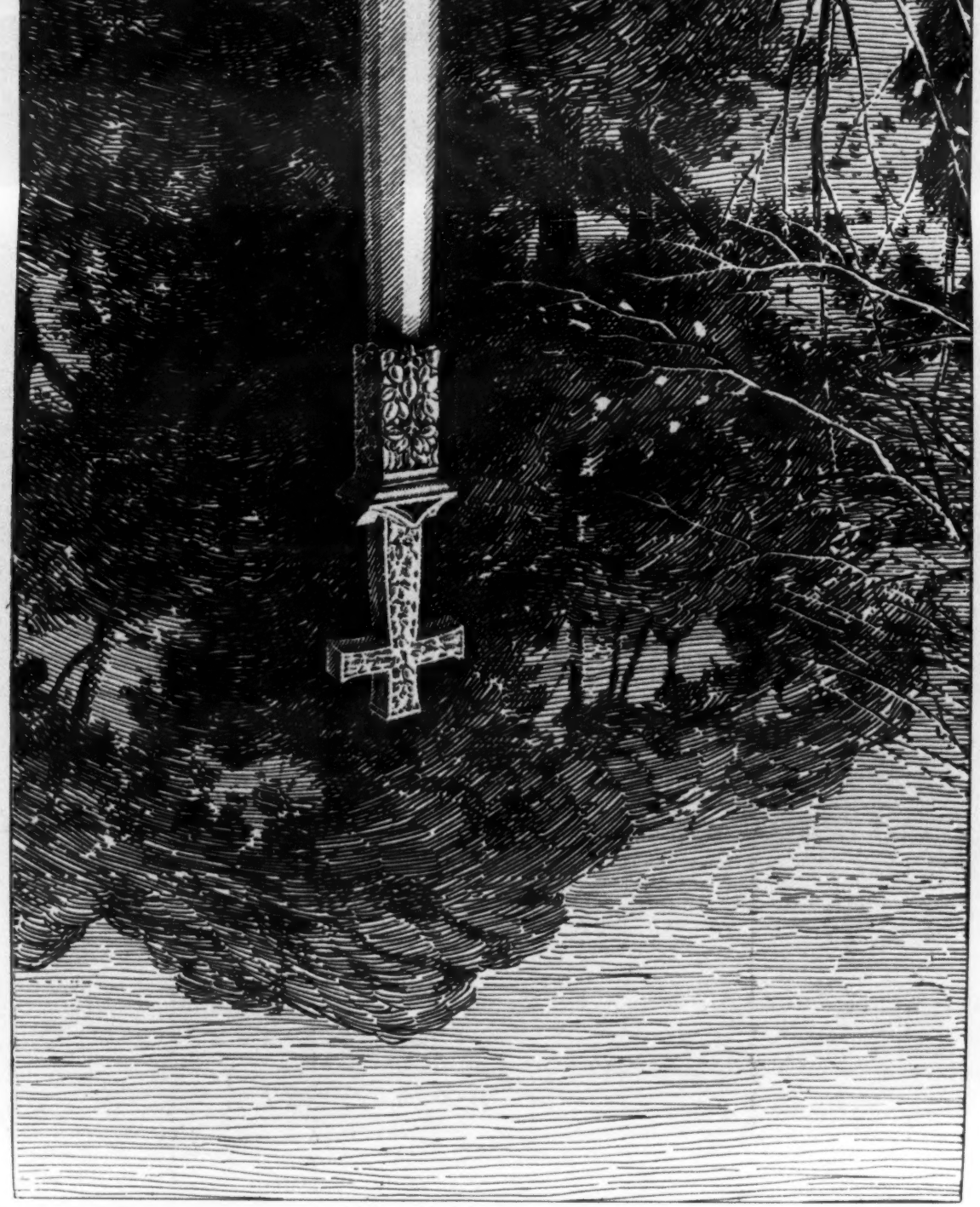

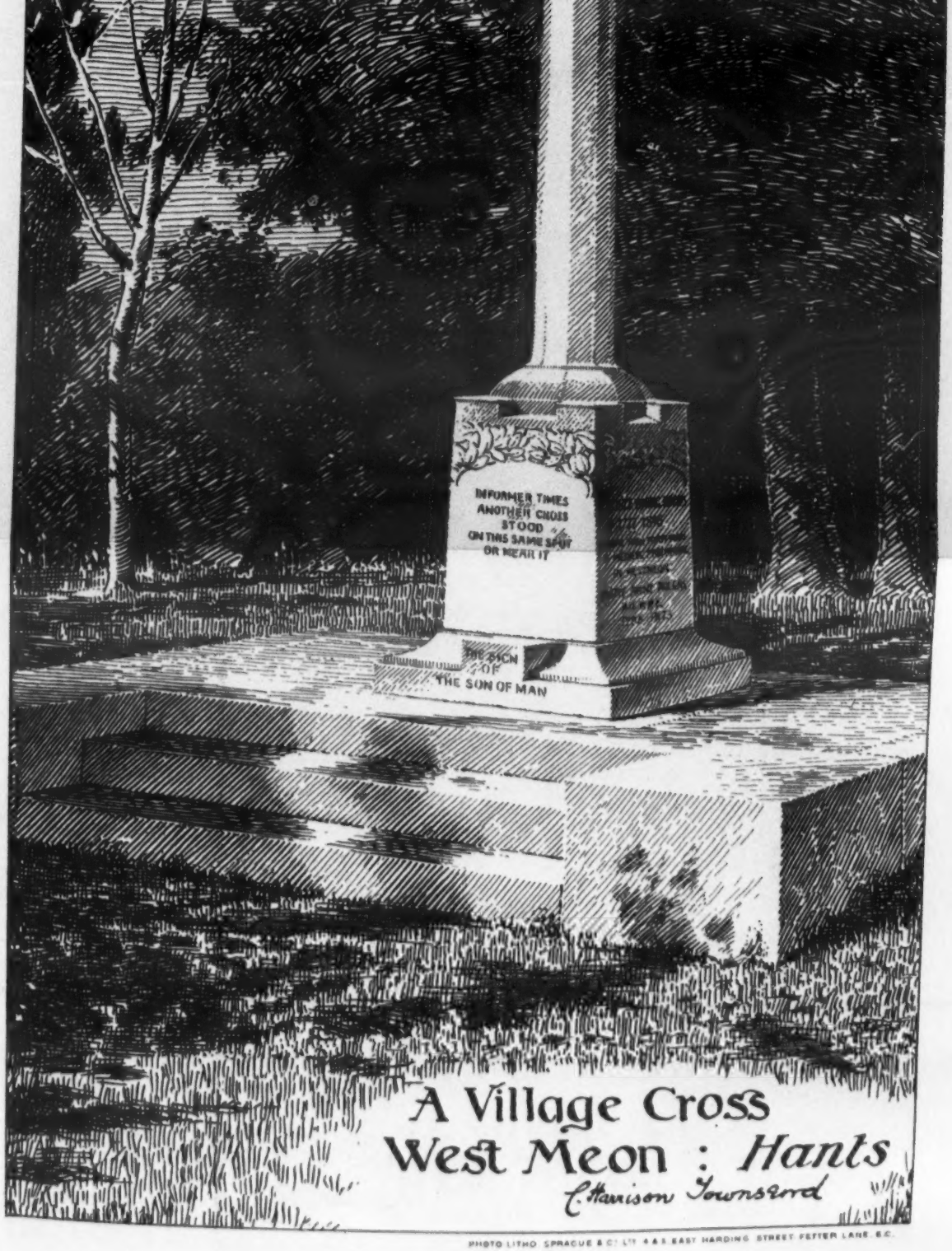

A Village Cross
West Meon : Hants

C. Harrison Townsend

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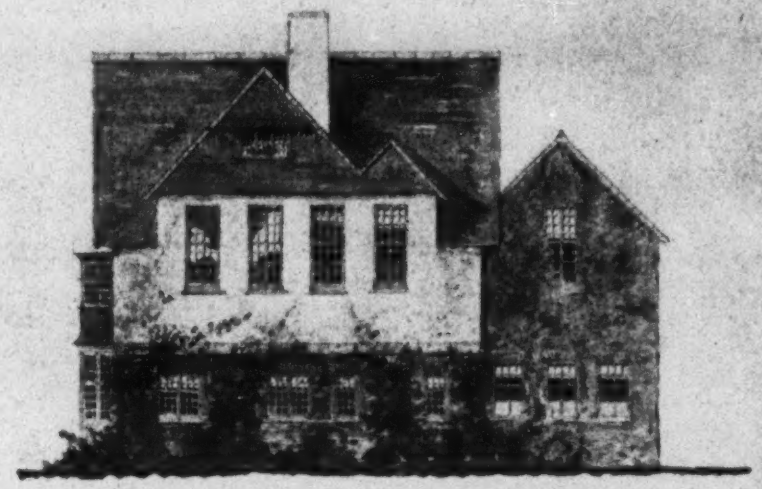
Proposed Seaside Convalescent Home

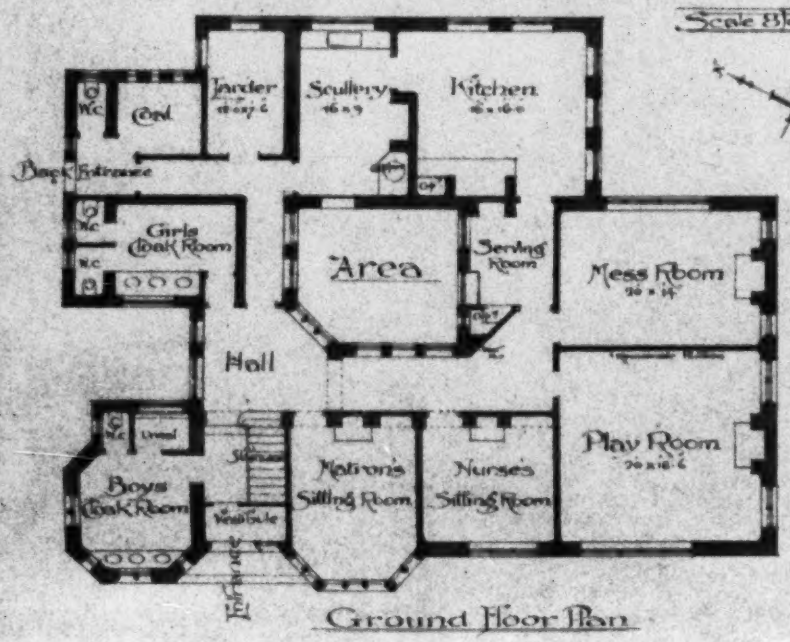
for The East London Hospital for Children :: Preliminary Sketch Plans

Elevation of Entrance Front

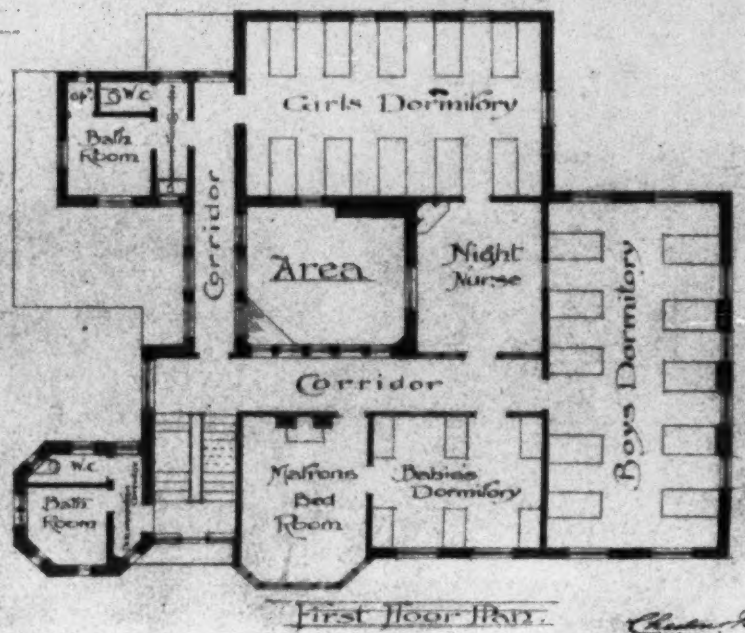


Elevation of Boys Dormitory Wing &c.

Scale 8feet to One Inch.



Ground Floor Plan



First Floor Plan.

Charles Robinson & Cleaver
2 Lincoln Court
London W.C.

Inst. Photo Sprague & Co Ltd 4 & 5 East Harding Street Fetter Lane E.C.

New Billiard Room
Clewer Park
for Sir Henry Gooch Bart
Chesterton & Perkins Arch.ts
5 Union Court, Old Broad Street E.C.

Sketch.

Elevation.

INK PHOTO SPRAGUE & Co LTD 4 & 5 EAST HARDING STREET, FETTER LANE, E.C.

practice. The stability and solidity of the wall, in my opinion, is greatly decreased. Pointing of the joints in cement or parian is a mere sham, which is proved by the number of open joints that can be seen in most glazed walls a short time after construction. Are we to continue with the sacrifice of strength, homogeneity, equal settlement and good pointing to the large brick?

I am confident that most bricklayers would welcome the larger joint. The greater ease with which the brick could be laid would compensate for any extra material; and finally the pointing could be executed in a workmanlike manner with the trowel instead of scamping it over, which is forced on the operator by the fad of appearance.

C. Oakley.

Bromley.

Sir,—The suggestion made in a letter in your issue of last week, that the thickness of glazed bricks for London should be reduced from 2¾ in. to 2½ in., is one that is easily met by manufacturers. All glazed bricks of the best makers are made by hand, each brick is weighed separately to secure uniformity of thickness, and is then pressed by a hard screw press. It is thus a matter of little importance to the manufacturer, and no additional expense, whether the brick asked for is 2¾ in. or 2½ in. No machinery requires alteration, as the thickness of the brick depends on the quantity of clay put into the press.

H. R. Allen.

Halifax.

INQUIRY FOR A MODEL FARM.

Sir,—Can you or any of your readers inform me, through the medium of your paper, of the whereabouts of a model farm homestead of about 200 acres, erected recently, within fifty miles of London.

Louis Moore.

The Student's Column.

CONCRETE-STEEL.—XIV.

SHEARING STRESSES IN BEAMS

(continued).

We will next consider a horizontal longitudinal section of a beam in connexion with the influence of horizontal shear in the plane of junction between the concrete and the steel reinforcement, with the view of throwing light upon the adequacy of adhesion between concrete and steel for the resistance of horizontal shear.

Let the symbols E'_c and E'_s represent the coefficients of shearing elasticity of concrete and steel respectively, and let q_{ct} and q_{st} represent the intensities of shearing stress at any point on the concrete and the steel reinforcement in a beam.

Then, assuming that the concrete and steel act together as if they were one homogeneous substance, and that plane sections remain plane after flexure, it follows that

$$\frac{q_{ct}}{q_{st}} = \frac{E'_c}{E'_s}.$$

Similarly, if f_{ct} and f_{st} represent the intensities of normal stress on concrete and steel respectively, at any point in a plane section inclined at 45 deg. to the horizontal, we have

$$\frac{f_{ct}}{f_{st}} = \frac{E_c}{E_s}.$$

We have already shown that the intensity of normal stress on diagonal planes is equal to the vertical or horizontal shearing stress acting at the same point. Consequently

$$\frac{E'_c}{E'_s} = \frac{E_c}{E_s}.$$

Let us now take a horizontal longitudinal section of a beam through the centre of the reinforcement, and assume the reinforcement to consist of horizontal bars. Let b represent the width of the beam, and t the collective width of the reinforcement, each measurement being taken in the plane of the section.

Then in a portion of the length δx in the horizontal plane, the area of concrete is

$(b - t)\,\delta x$, and the area of steel is $t\,\delta x$.

Hence, if q represents the intensity of horizontal shearing stress on the portion $b\,\delta x$ of the longitudinal section, we get

$$q\,b\,\delta x = q_{ct}\,(b-t)\,\delta x + q_{st}\,t\,\delta x$$

and the intensity of horizontal shear on the concrete is

$$q_{ct} = \frac{q\,b\,E_c}{E_c(b-t) + E_s\,t} \quad \ldots\ldots\ldots\ldots\ldots\ldots \text{(a)}$$

If the ratio expressing the relative values of the coefficients of elasticity for concrete and steel be determined for the materials employed in any given construction, this equation can be simplified. Thus, if the values of the coefficients be $E_c = 3\,000{,}000$ lbs., and $E_s = 30{,}000{,}000$ lbs., corresponding with the ratio 10, we have

$$q_{ct} = \frac{q\,b}{(b-t) + 10t} \quad \ldots\ldots\ldots\ldots\ldots\ldots \text{(b)}$$

The agreement of this rule with the previously stated principles governing the distribution of shearing stress may be seen by taking a horizontal longitudinal section through the concrete just above the reinforcement. Then $t = 0$, and $E_s = 0$, and the result is

$$q_{ct} = \frac{q\,b}{b} = q \quad \ldots\ldots\ldots\ldots\ldots\ldots \text{(c)}$$

In this case the concrete takes the whole of the horizontal shear, but when steel reinforcement is present, most of the shear comes upon that material, and, as shown by the equation in the forms (a) and (b) the value q_{ct} is proportionately reduced.

Moreover, as already shown, the intensity of vertical and consequently of horizontal shearing stress diminishes with its distance with the neutral axis. Consequently, in concrete-steel beams of ordinary design there is very little probability that the shear in the horizontal plane of junction between the concrete and the steel will be sufficient to overcome the adhesion between the two materials.

On reference to Table XX. it will be found that the average adhesion may be taken at about 350 lbs. per square inch, and unless the greatest value of q_{ct} obtained by the foregoing equation exceeds the safe adhesive strength of the combined material, the beam will be perfectly safe so far as the effect of horizontal shear is concerned.

In this connexion it may be mentioned that, in various experiments made upon concrete-steel beams, fracture has resulted without any evidence being given of slipping of the concrete on the steel. Still, in short and heavily-loaded beams, and in long beams where a high percentage of reinforcement permits heavy loading with a relatively small sectional area of concrete, the shear may become excessive, and in such cases it is important to ascertain whether the intensity of horizontal shear is likely to overcome the adhesion of the materials.

The next question is suggested by the resolution of shearing force, first, into four equal tangential forces, as in Fig. 24, and, second, into two equal forces acting normally to diagonal planes at right angles to each other, as in Fig. 25.

Taking any diagonal cross section of a beam inclined at 45 deg. to the horizontal, and subject to normal tensile stress, we have to ascertain whether or not the intensity of such tensile stress, normal to the diagonal plane, is within the permissible limit for concrete. It will, of course, be understood that the diagonal lines in Fig. 28 representing tension and compression, merely illustrate the relative intensities of stress at particular points in the length of the beam, and that there is no arithmetical or other limit to the number of similar hypothetical planes.

Nevertheless, as tension and compression exist in opposite diagonal directions, it is necessary to base calculations upon the intensity of stress existing at assumed positions in the length of a beam.

Leaving the resistance of normal compressive stress to the concrete alone, we will devote attention to normal tensile stress.

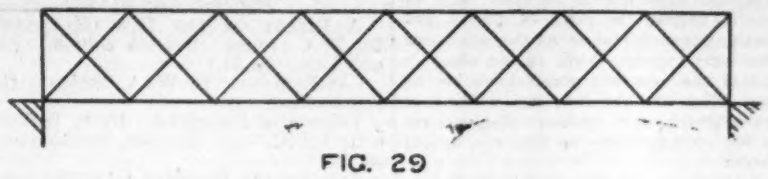


FIG. 29

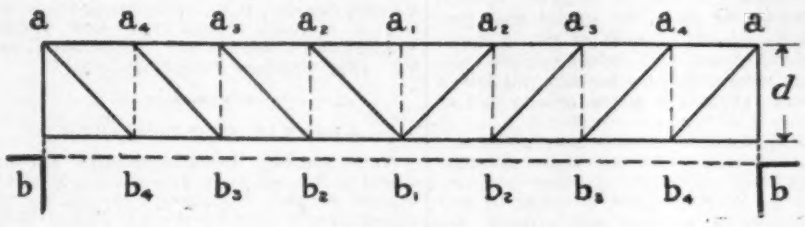


FIG. 30

Illustrations to Student's Column.

For the purpose of illustrating the calculation of "diagonal" tension, we might regard a concrete-steel beam as approximately resembling a lattice-girder, Fig. 29, which includes two systems of the Warren type, and is subject to tensile and compressive stress in the diagonals of the web, somewhat as we have found such stresses to exist in the part of a concrete-steel beam that acts as the web. As the stresses in the intersecting diagonals of a lattice girder of this type are unequal unless verticals be introduced between the apices of the two systems, our object will be better served by considering tensile stress resulting from shear to be concentrated along the lines occupied by the ties in a Linville or "N" girder.

As an example we will take the case of a concrete-steel beam, Fig. 30, under a uniformly distributed load, and having horizontal reinforcement sufficient to ensure safety against the effects of bending moment. As we shall disregard concrete below the axis of the reinforcement, the lower part of the beam is drawn in broken lines in the figure. Let

b = breadth of the beam ..... = 5 in.
d = depth from top of beam to axis of reinforcement ..... = 10 in.
l = clear span between supports ... = 80 in.
δx = distance between assumed diagonals ..... = 10 in.
w = load per in. run..... = 100 lbs.

The load applied upon the top of the beam is practically equivalent, so far as concerns stress on the assumed diagonals, to downward vertical forces equal to wx, acting at each of the points, a_1, a_2 a_3, a_4, and downward forces equal to $\frac{1}{2}wx$, acting at the points a, a. The total tensile stresses along the diagonals may be ascertained by adding together the stresses due to the different weights, or by the simple rule,

$$P_t = \frac{(n-2y)+1}{2} w\delta x \sec\theta.$$

Where

P_t = total tensile stress on any diagonal plane,
n = number of bays formed by assumed diagonals,
y = numerical order of any bay from the abutment,
θ = inclination of assumed diagonals.

In this case the inclination of the diagonals to the horizontal is 45 deg., and the value of $\sec\theta = 1.41421$, say 1.414.

Calculating the tensile stresses on the diagonals for one half of the beam, we have

on a b_4 $P_t = \frac{(8 - 2\times 1) + 1}{2} \times (1{,}000 \times 1.414) = 4{,}949$ lbs.

on a_4 b_3 $P_t = \frac{(8 - 2\times 2) + 1}{2} \times (1{,}000 \times 1.414) = 3{,}535$ lbs.

on a_3 b_2 $P_t = \frac{(8 - 2\times 3) + 1}{2} \times (1{,}000 \times 1.414) = 2{,}121$ lbs.

on a_2 b_1 $P_t = \frac{(8 - 2\times 4) + 1}{2} \times (1{,}000 \times 1.414) = 707$ lbs.

Dividing each of these results by the area of the diagonal plane = $(10 \times 5 \times \sec.\,\theta) = 70.7$ square in., we have the intensity of tensile stress per square in., f_t for each diagonal plane.

Thus

on a b_4 $f_t = 70$ lbs. per square in.
on a_4 b_3 $f_t = 50$ lbs. " "
on a_3 b_2 $f_t = 20$ lbs. " "
on a_2 b_1 $f_t = 10$ lbs. " "

These figures show that in the case of a b_4, the stress is beyond the limit of 50 lbs. per square inch, generally taken as the allowable unit stress for concrete. Still, as the ultimate resistance of the concrete would probably be between 250 lbs. and 300 lbs., it is clear that the beam might be safe without diagonal reinforcement, although one or two ties would be desirable.

Under more severe conditions of loading than those assumed, and ranging up to the ultimate resistance of the beam, we should have proportionately greater intensity of tensile stress on diagonal planes, and, unless suitable reinforcement were added, the beam might fail in consequence of tensile stress arising out of shear.

Reverting to the conditions now under discussion, we may point out that as some designers leave the effects of shear to be resisted by the concrete alone, it would be perfectly reasonable to take into account the resistance of the concrete when settling the sectional area of the reinforcement. The other alternative is to disregard altogether the strength contributed by the concrete, and to provide sufficient steel to resist the whole of the tension due to shear.

In the first case, limiting tensile stress on the concrete to 50 lbs. per square inch, and taking the area of the diagonal planes at $(10 \times 5 \times sec.\ \theta) = 70{\cdot}70$ **square in., we have** for the resistance of the concrete

$$50 \times 70\,70 = 3\,535 \text{ lbs.},$$

leaving $(4\,949 - 3.535) = 1,414$ **lbs. to be met by** steel reinforcement in the first bay, while in the remaining portions of the beam, between the abutment and the centre, tension can be met by the concrete alone.

If the limit of tensile stress for the steel be fixed at 15,000 lbs. per square inch, the sectional area of the steel tie along the diagonal $a\,b_4$ will be

$$1,414 \div 15,000 = 0{\cdot}0942 \text{ square in.}$$

It would perhaps be more correct to calculate the area of the concrete by taking the effective depth between the axes of compression and tension. Assuming the position of the neutral axis to be 5 in. above the centre of the reinforcement, the effective depth would be $(5 + 3.3) = 8.3$ in., or, say, 8 in. Then, proceeding as before, the area would be $(8 \times 5 \times sec\ \theta) = 56.56$ square inches, and the resistance of the concrete $(56\,56 \times 50) = 2,828$ lbs. This would leave $(4,949 - 2,828) = 2,121$ lbs. to be met by the first diagonal tie, $a\,b_4$. Thus it is clear that a very safe rule would be to regard the concrete as taking one half of the tension on any diagonal plane.

In the second place, disregarding the value of the concrete altogether, the areas of the diagonal ties should be as follows:—

$a\ b_4$	$4.949 \div 15\,000 = 0{\cdot}3290$ square in.
$a_4\ b_3$	$3.535 \div 15.000 = 0{\cdot}2356$ square in.
$a_3\ b_2$	$2.121 \div 15.000 = 0{\cdot}1414$ square in.
$a_2\ b_1$	$707 \div 15.000 = 0.0471$ square in.

As it would be inconvenient in practice to use round rods of different diameters, or thin strips of different gauges, the average section of 0.1885 square inches might be adopted in conjunction with a suitable adjustment of the spacing, the ties being placed near together at the abutment, and the distance progressively increased towards the centre of the beam.

Another method of calculating the sectional area of reinforcement in the form of ties, or "stirrups," for resisting tension on planes inclined at 45 deg. to the horizontal, is given by Dr. Slocum, of Cincinnati University, in the following terms:—"The maximum intensity of tensile stress is first found for points midway between successive stirrups. The average of these two intensities is taken and multiplied by the width of the beam times the distance between two successive stirrups measured on a horizontal line, not greater than the depth of the beam. If this tension is divided by the safe unit stress for steel, it will give the area of the steel required in a cross section of the stirrups."

This method appears to be based upon the ordinary expression, $Q = q\,b\,\partial x$, for ascertaining the amount of shear on a horizontal plane. Stated algebraically, it gives the equation $P_1 = max.\ f_1\ b\ \partial x$, where P_1 = total tension on any tie. Denoting the safe unit stress for steel by f_1, the area of steel is $P_1 \div f_1$.

The practice of some engineers is to place the reinforcement for resisting shear at right angles to the horizontal, but from the preceding discussion it is evident that the ties or stirrups should be perpendicular to the planes subject to normal tensile stress, and should be inclined at an angle of 45 deg. to the horizontal.

BOOKS RECEIVED.

A Digest on the Law of Easements. By L. C. Innes. Seventh edition. (Stevens and Sons. 7s. 6d.)

Gas Engines. By W. A. Tookey. (Merritt and Hatcher. 1s.)

Technical Plumbing. By S. Barlow Bennett, R.P.C. (J. Harrison, Stockton-on-Tees. 2s. 6d.)

Elementary Building Construction and Drawing for Scottish Students. By Charles Gourlay, B.Sc. (Blackie and Son. 6s.)

The Modern Carpenter and Joiner. Edited by G. Lister Sutcliffe. Divisional-Volume VI. (The Gresham Publishing Co.).

GENERAL BUILDING NEWS.

New School, Loughborough.—The new school in Rendell-street, Loughborough, will be opened shortly. Competitive designs for this school were invited by the late School Board about two years ago, and five designs were submitted by local architects, Messrs. Barrowcliffe and Allcock, with two designs, securing the first and second places. The new building is arranged upon the corridor system, and consists of a schoolroom 59 ft. by 23 ft., divided by a sliding partition for separate classes, and three classrooms about 25 ft. square. An 8 ft. corridor divides the schoolroom from the classrooms, and communicates with the entrance lobbies and cloakrooms. It is separated from the classrooms by large glazed screens. The girls' and boys' entrances are placed at the extreme ends of the building and have large cloakrooms. There are also storerooms for books, etc., and teachers' retiring-room, with lavatory adjoining. The whole of the internal walls, to a height of 4 ft., are lined with cream-glazed tiles, with stucco to walls above. The floors throughout are maple boards, laid on concrete, and all the internal joinery is of pitch pine. The heating is by Grundy's patent ventilating stoves. The corridor is covered by a flat roof, enabling school and classrooms to have windows on both sides to provide cross ventilation. The windows are carried up to ceiling levels, and have opening fanlights above transome, with steel hopper casements, for introduction of fresh air at sill level. The extract ventilation is by Boyle's ventilators, fixed in turrets upon roofs, and connected with grids in ceilings by separate metal ducts. Asphalted playgrounds and covered playshed are provided for each sex. Externally, a simple treatment of Renaissance character has been adopted. The building is faced with Gibbs' sandstock bricks, and has terra-cotta dressings, supplied by the Hathern Station Brick Company. The contractor is Mr. A. Faulks, and the architects Messrs. Barrowcliffe and Allcock.

Synagogue, Stoke Newington.—The new synagogue and classrooms situated in Shacklewell-lane, Stoke Newington, were recently opened. The synagogue gives seating accommodation for 450 men and 300 women, while the classrooms will hold 250 children. Mr. Lewis Solomon is the architect. The total cost, including the site, is about 12,000*l.*

Co-operative Society Branch, Deckham, Gateshead.—A new branch of the Gateshead Co-operative Society has been opened at Deckham, Gateshead. The building is of brick with stone facings. On the ground floor are the provision shops, and on the second floor drapery and hardware departments. At one end of the building is a self-contained house, and at the opposite end there is an upstairs and a downstairs flat. The cost of the building was 8,000*l.* It is fitted throughout with the electric light, and there is a lift from the ground floor to the floor above. The contractors were Messrs. Raven and Hitcham, Gateshead, for the brick and masonry work, and for the woodwork and fittings Messrs. Greason Bros., also of Gateshead. There is on the premises a 25 b.h.-p. engine for driving the dynamos and working the lift. The electric fittings were put in by Messrs. Mason and Co., Gateshead. Mr. Edwin Bowman, Newcastle, was the architect for the work.

Municipal Buildings, Crewe.—The foundation-stone of the new municipal offices, Crewe, has just been laid. The buildings are being erected by Messrs. Robert Neill and Sons, Manchester, from designs by Mr. H. T. Hare, London. The total cost, with furnishing, will be about 18,000*l.*

Council Offices, Prestatyn, Wales.—The opening of the new offices and fire-station for the Prestatyn Urban District Council took place on the 21st ult. The new building is three stories in height, and has an elevation of Ruabon pressed brick, with terra-cotta ornamentations and Gwesfyr stone dressings. The accommodation comprises a council chamber, and a suite of offices for the clerk and surveyor, and on the ground floor is the fire-station. The contractor is Mr. Joseph Williams, who carried out the work from plans made by Mr. Bell, a former surveyor, under the superintendence of Mr. Thomas, the present surveyor.

School, West Hartlepool.—On the 23rd ult., the new Jesmond-road school, West Hartlepool, was opened. The new building occupies a site of 6,000 superficial yards, and the type of plan adopted is that of a central hall, with classrooms arranged along both sides. There are 24 classrooms, each accommodating about 50 to 60 scholars, the infants and junior mixed department being on the ground floor, and the senior mixed occupying the whole of the first floor. The lighting is by electricity, and the ventilating apparatus is also driven by electric power. The exits are arranged so that the whole building can be cleared of its occupants in two minutes. The school provides accommodation for 1,448 children, and it has been built at a cost of 21,000*l.* The contractor was Mr. Thos. Beetham, of West Hartlepool, and the architect Mr. Percy Hinde.

Underground Conveniences.—The Lambeth Council have just completed two underground conveniences—one at Loughborough Junction, and the other opposite St. Thomas' Hospital, at the end of Westminster Bridge—designed by Mr. Edwards, Engineer to the Council. The ranges of urinals—which are different from those usually employed in the London pubiic conveniences—have been specially manufactured by Messrs. Adams and Co., of Westminster. They have white circular fireclay backs with dark green mouldings, set against St. Anne's marble slabs, with St. Anne's marble flushing tanks. The contractor for the work was Mr. J. Parsons, of Waterloo-road.

New Buildings and Memorial Fountain, Guy's Hospital.—The new library for the use of the students and the medical school has been built by Messrs. Holloway Bros., after plans and designs by Mr. J. H. T. Wood, architect to the governing body. The library, a gift of Sir Frederick Wills, M.P., occupies the entire ground-floor of the building adjacent to the new physiological department, and the two blocks are portion of a scheme for the gradual remodelling of the medical school museums and allied departments. It will contain space for 10,000 volumes, the cases and panellings, of carved oak, are arranged so as to form separate bays for the students, each bay having its own window and being furnished with a large oaken reading-table. In the colonnade that stands next south to the entrance-door of the Astley Cooper Ward, has been erected a memorial in honour of Guy's men who fell in the course of the South African War, 1899-1902. It is in the shape of a drinking fountain, after a classic design, having a base 6 ft. 6 in. wide and 7 ft. 6 in. high, constructed of Siena marble, with columns of Verte-Antico at the sides, their Ionic capitals being of gun-metal, and the entablature of Pavanazza. The hospital coat of arms, executed in enamel and bronze, surmount of pediment, and cherubim support a canopy in which is the inscription in letters of gun-metal. The Coalbrookdale Company executed the memorial from the designs of Mr. Frederick Wheeler.

New Wesleyan Chapel, Corsham.—The memorial-stones of the Wesleyan Chapel, which is to be erected in Pickwick-road, Corsham, were laid recently. The new building, which is in the Gothic style, with open timber roof and traceried windows, will provide seating accommodation for three hundred persons, and it is estimated to cost 1,500*l.* Mr. Bromley is the architect, and the contractor Mr. Moore, of Trowbridge.

Extensions to Sunderland Asylum.—The new male patients' villa and the nurses' home at the Sunderland County Borough Asylum, at Ryhope, have now been completed. The male villa is entirely detached from the main building, the object being to avoid, as far as possible in further extension, the continuance of what might be termed the barack-room system. The new villa provides accommodation for forty patients, and contains in all twenty-one rooms, including dining-room, dayroom, three dormitories, five single bedrooms for private patients or attendants, and the usual kitchen, scullery, etc. The nurses' home will accommodate twenty-five nurses, and is handsomely furnished. It is connected with the main building by a corridor. The contract for erecting the two buildings was let to Mr. Joseph Elliot, of North Shields, who has executed the work under the supervision of the Borough Engineer, Mr. J. W. Moncur, assisted by Mr. Thomas Axtell as clerk of works. The cost of the nurses' home is 3,882*l.*; the male extension, 5,434*l.*; draining and sanitary plumbing, 960*l.*; and furnishing, 1,085*l.*—total, 11,361*l.*

Central Hall, Birmingham.—The new Wesleyan Methodist Central Hall, which has been erected in Corporation-street, Birmingham, was opened on the 16th ult. The building is designed in the renaissance style. It covers an acre of land, and has a frontage of 224 ft. to Corporation-street, 113 ft. to Ryder-street, and 275 ft. to Dalton-street. The ventilating tower rises 180 ft high. There are five entrances to the building; two from Corporation-street, two from Dalton-street, and one from Ryder-street. It is intended to use the ground floor and basement as shops and for commercial purposes. The main entrance to the hall is in Corporation-

street beneath the tower, and in the porch are terra-cotta panels in bas-relief depicting incidents in the life of John Wesley. From the hall rises a double staircase leading to a corridor, from which the synod hall and great hall are approached. The latter is the principal feature of the building. It is arranged in the form of an amphitheatre, and will accommodate 2,000 persons besides the orchestra. Ample provision has been made for quickly emptying the building, there being twenty-one exits. On the first and second floors are the synod hall, Sunday school, ladies' parlour, library, gymnasium, girls' club-room, and men's club-room, and a number of committee and class-rooms. The synod hall will accommodate about 450, the Sunday school 400, and committee rooms about 100 each. In the basement a room is set apart as a ragged school, and its close proximity to the kitchens makes it that it can be easily adapted in time of distress for feeding the poor. The heating arrangements are a combination of hot water and hot air systems, and have been carried out by Messrs. Haden and Co., of Trowbridge and Birmingham. There is also a twofold system of lighting—electricity and gas—but the gas installation is on a minor scale, and is only intended to be an alternative service in the event of the electric supply failing. The entrance-hall and main corridors are laid with mosaic, the staircases and landings being of granolithic cement. Mr. Ewen Harper, of Birmingham, is the architect, Messrs. John Bowen and Sons being the contractors. The cost of the building has been 65,000*l*.

Victoria Memorial, Crathie.—On the 20th ult., a bust of the late Queen was unveiled by the King in the Parish Church, Crathie. The monument consists of a portrait bust in white statuary marble, and is placed in a granite niche on the face of one of the granite pillars which support the arches of the chancel and the Royal transept. The bust is of the finest Carrara marble, and the Queen is represented as wearing the crown with a veil. She also wears State robes and the Order of the Thistle. In the design of the niche and canopy advantage is taken of the variety of colours in the granite of Aberdeenshire. The pillar itself is of Deeside light grey. The interior of the niche is of a darker shade of polished grey, and the canopy and sides are of coral-coloured granite from Donside, while the panel containing the inscription is of the same granite, but with a deeper shade. The inscription is incised and gilded. Like the rest of the church, the niche with bracket and canopy is designed in the Scottish phase of the decorative Gothic period. The bracket on which the bust stands is carved in granite, a winged angel's head supporting the panel which carries the inscription. The base of the niche is moulded and the sides enriched with pinnacled buttresses, moulded and carved; but the leading feature in the scheme is the richly carved canopy which enshrines the monument. The design was the joint work of Herr Emil Fuchs, and Mr. A. Marshall Mackenzie, of Aberdeen, the bust being the work of the former, and the niche, canopy, and bracket of the latter. Two mural tablets have also been erected, one at each side of the Royal pew. These are of dove-coloured marble with medallions of white Carrara marble and borders of Caen stone. The King has also had a canopy erected over the pulpit. The design is in light Gothic open work, which bears at intervals shields showing the arms and emblems of the writers of the New Testament. The canopy may be raised or lowered by a chain of wrought iron and brass.

Church, Beeston Hill, Leeds.—The foundation-stone of the church of the Holy Spirit, to be erected at Beeston Hill, Leeds, was laid on the 26th ult. The new edifice, which is to cost about 10,000*l*., and which is to provide seating accommodation for 800, has been designed by Messrs. Prothero and Phillott, architects, of Cheltenham. It is to be built of stone from Horsforth, with Ancaster stone dressings outside, and Bath stone dressings inside. The style of architecture is to be the Late Perpendicular. The plans provide for a tower, but it is proposed to erect only twenty feet of this in the meantime.

Gresham's School, Holt, Norfolk.—The new buildings, which were opened on the 30th ult., supersede the present school buildings in the Market Place of Holt, which were rebuilt about forty-five years ago on the site of the former and original buildings of the school, which was founded and endowed by Sir John Gresham in 1555-56. The new buildings are on the north side of the Cromer road, half a-mile from Holt. They are designed in two separate blocks, the one on the west containing the headmaster's house, dining-hall, boys' studies and dormitories, kitchens and offices, and that on the east containing the school buildings, assembly hall, laboratories and workshops. The buildings can be connected by a cloister later on, if required. In the centre of the master's house block is placed the boys' dining-hall, and on either side are placed the master's private apartments, and the boys' studies and dormitories. The breathing space in the dormitories for each boy is 300 cubic feet. Lavatories and bath-rooms are placed at the end of each dormitory. Over the dining-hall is an isolated sick room, with separate bath-room, and nurses' room adjoining. On the west side of the dining-hall, the remainder of the buildings, which are in three stories, comprise the master's house, communicating on the main stair landing with a corridor leading to the boys' dormitories by a pass door. In the rear of the ground-floor are the kitchen and offices, with servants' rooms over, approached by a separate staircase. To the east of these buildings, but in the same line of frontage, is the school building, in the form of a three-sided quadrangle; the west side containing the school assembly hall, 70 ft. by 32 ft., with tracery windows and open timber roof of a late Gothic type. From this hall a wide corridor runs eastwards, with class-rooms and cloak-room on the north side, ending in a return wing containing the laboratories, workshops, and lecture rooms. The class-rooms contain 483 ft. superficial each, for the accommodation of twenty-four boys each, allowing over 20 square feet for each boy, the lighting in all cases being left-handed, and all the rooms have additional lighting from the corridors, and also means of cross-ventilation. The rooms are all fitted with double-hung sashes with deep window boards, extract ventilation flues connected to a main exhaust, and are heated with hot-air stoves, with additional heating from low-pressure hot-water pipes. On the second floor a special drawing class-room has been provided. There are also chemical laboratory, physical laboratory, the metal workshop, and carpenters' shop. Electric light is used in the whole of the buildings, supplied from an installation specially erected in the school grounds. The buildings have been carried out in the domestic renaissance style of building, prevalent in the early seventeenth century (except the hall, which has been given a late Gothic character), and are all faced with red local bricks and Ancaster stone, the roofs being covered with Broseley tiles. The general contractor was Mr. George Riches, of Cromer, the sub-contractors being:—For the plumbing and drainage—Messrs. Matthew Hall and Co.: for the heating and cooking apparatus—Messrs. F. Edwards and Son: for the wrought-iron work—Messrs. Starkie, Gardner and Co. The electric light plant and installation was designed by Messrs. Massey and Alipress, and the work has been largely executed by Messrs. Wells and Co. The fittings for the laboratories have been carried out by Messrs. Baird and Tatlock, from the architect's design, and the school desks have been provided by Messrs. Hawes of Norwich, and the Bennett Furnishing Co. The buildings were designed and have been carried out under the personal supervision of Mr. H. Chatfeild Clarke, architect, of London.

MISCELLANEOUS.

Professional and Business Announcements.—In consequence of the death of Mr. Nightingale, builder, of Albert Embankment, the business will in future be carried on by his sons, who have entered into partnership under the name of "B. E. Nightingale."——Mr. Edwin J. Sadgrove, architect, has removed his offices from 22, Surrey-street, to 4, Southampton-row, W.C.——Messrs. Dent and Hellyer, sanitary engineers and plumbers, have removed from their old premises at 21, Newcastle-street, Strand (the site being required by the County Council for the Holborn-Strand improvements), to 35, Red Lion-square, and 75, Theobald's-road, W.C.—Mr. Francis W. Bedford, architect, has transferred his principal office from Greek-street Chambers, Leeds, to 22, Old Burlington-street, London, W., retaining the Leeds address as a branch office, where he can be seen by appointment.

Felt Linings.—Messrs. Engent and Rolfe, Poplar, send us a specimen of their "∃< Hair Bitumen," a felt for underlining roof covering, and lining, walls, partitions, floors, etc. It seems to be a very good material in a constructive and sanitary sense, but has a strong bituminous smell, so that in residences, etc., it could only be used where it is entirely covered and shut in.

Royal Academy Lectures.—The card of lectures at the Royal Academy for the session 1903-1904 leaves the lectures on painting and sculpture a blank for the present. In architecture, Professor Aitchison is announced to give a course of four lectures on Vitruvius, a subject which he probably knows more about than any one else. These will be given on February 29, March 3, March 7, and March 10.

Leeds School of Art.—At the opening lecture in connexion with the class of architectural design, on the 24th ult., Mr. Butler Wilson, the President of the Leeds and Yorkshire Architectural Society, occupied the chair, and in a short address, after congratulating them on the occupation of their new buildings, he said he had long thought that pupilage should be preceded by some elementary training preparatory to an office career. Many architects who refused to receive pupils as beginners would probably take them if they were well grounded, and in such cases the period of pupilage would obviously be shortened. A year or two spent in a school of architecture should enable a student to acquire at moderate cost the rudiments of his work before learning in an architect's office the practical details of his profession, and the Committee of that Institute had equipped the several departments with facilities previously unknown in connexion with the drawing schools of Leeds. Mr. F. Musto, the architectural teacher in the new School of Art, then gave a lecture on "The Study of Architectural Design: Its Necessity and Its Recompense." He remarked that young men starting their profession found no difficulty in taking up constructional work, but somehow he usually found that beyond that they had not gone. As time went on he trusted they would find that they were increasingly looking at design and the artistic side of things. The subject of design did not appear in the intermediate programme at all. He had had to discourage young men from beginning the study of architectural design because they had not gone over the preliminary ground, but when once they had passed that preliminary ground the sooner they got to work on thinking out actual design work the better. He advised students to visit old and new buildings, and in addition to measuring and sketching and analysing, he suggested that they should criticise and sum them up, and consider whether it ought not to be possible to improve upon them. Alluding to a letter which appeared recently in the *Yorkshire Post* from a lady, he said she complained bitterly that architects were most horrible people, who would not provide cupboards and several other things. He thought that lady was perfectly justified in her complaints. An architect who designed a house that had not enough cupboards and proper bathroom and wash-house arrangements, and proper facilities for carrying on household work, ought to become something different from what he was. As to the rewards of architects, these were few and far between. The engineer and the contractor, and the secretary and anybody else, could get his name in the papers, and get presented to Royalty, and get honours and baronetcies, but an architect had to live on his own innate appreciation of his art. The prospects of a man who had not only studied construction but detail and design work were, however, greater than those of a man who had done nothing but constructional and strictly practical work.

A Questionable Improvement at Hampstead.—Some of our readers are doubtlessly familiar with the steep and narrow lane, blocked with a toll-gate, which, as it descends from the end of Church-row to Frognal and West End-lane, skirts the northern side of the parish churchyard. The Borough Council have just purchased the toll-bar and its quaint little toll-house, together with an adjoining strip of land, for the purpose of widening the lane and rendering it available for general traffic. The toll-gate at Hampstead is one of the last that have survived in the immediate neighbourhood of London. Why could they not have let it alone?

Recent Compensation Claims and Awards (London).—In the Westminster High Bailiff's Court the jury have made an award of 5,435*l*. in settlement of a claim for 9,604*l*. preferred by Messrs. Wyld and Robins, market-produce dealers, in respect of their premises at No. 19, James-street, Covent Garden. The house is acquired by the Great Northern, Piccadilly, and Brompton Railway Company, and it was stated in evidence that the value of the premises, which are held upon a lease, of which thirteen years are unexpired, at a rent of 150*l*. per annum, and are in close proximity to Covent Garden Market, was greatly enhanced by reason of their freedom from the Duke of Bedford's market-tolls, which vary from ½d. to 4d. for each package delivered into the shop. Mr. Douglas Young assessed the value at 2,300*l*. —At the Sheriff's Court, in Red Lion-square, has been concluded, after a four days' hearing, a case for a claim advanced by the London and India Docks Company against the North London Railway for a sum of 140,000*l*. The claim, made in that Court upon an order of the Court of Appeal, related to a small parcel of land having a quay frontage to Blackwall Basin, and formerly owned by the claimants, but now acquired by the Railway Company under statutory powers for widening and deepening the entrance from the basin into the Poplar Dock, which they have leased from the claimants for a term of 999 years. Sir Ralph Littler, K.C., Mr. Balfour Browne, K.C., Mr. Moon, K.C., and Mr. Joseph Shaw, were counsel for the Railway Company. The claimants were represented by Sir Edward Clarke, K.C., Mr. Edward Boyle, K.C., and Mr. Rowlatt. After a summing-up by Mr. Under-Sheriff Burchell, a special jury found for the Dock Company in the sum of 5,575*l*.

Widening of Sloane-street, S.W.—A scheme is formulated for carrying out an improvement of the northern end of Sloane-street, where the thoroughfare will be widened to a minimum of 60 ft. between Brompton-road and Basil-street. The estimated cost of the works, at the expense of the London County Council, is 75,000*l.*, towards which 20,000*l.* will be contributed by the Borough Council.

Drawing Appliances.—We have received from Messrs. Longman and Co. a set of specimens of set-squares, scales, etc., designed by Professor D. A. Low, and in which this eminent publishing firm are apparently dealing. They are all made in London, with special tools and appliances designed for the purpose. The peculiarity about the make of the set-squares is that they have bodies of a strong and tough white wood edged with transparent celluloid in the case of Design A, and with hard ebonised wood in the case of Design B. They are framed and faced with thin white polished celluloid. It is claimed that the celluloid facings give great strength to the squares, enabling them to be made much thinner than the framed set-squares which have been in use hitherto. The specimens are certainly both light and stiff, and the faces which come in contact with the paper being smooth and white any speck of ink or dust is at once seen and can easily be wiped or washed off. But the most important peculiarity is that the thin celluloid facings leave off within about 1-10th of an inch of the drawing edges of the square, so that when a square is resting on the drawing paper, the drawing edges stand above the paper to the extent of 1-100th of an inch. "This slight elevation of the drawing edge above the paper does not interfere with accuracy in drawing, and it is found that in inking in it reduces very considerably the chances of blotting or smearing." This we have no doubt would be the case. Another novelty is an adjustable protractor set-square, made of white celluloid, in which a moveable portion slides round in a quadrant groove in the body of the set-square, the moving portion divided up to 90 degrees, so as to supply a straight-edge set at any angle that may be required. It is ingenious, but a little stiff in adjustment, and we rather doubt its coming much into practical use. But the set-squares can certainly be recommended. There are also some drawing-scales printed on slips of wood, covered with a very thin coating of celluloid for preservation. It is claimed that the wood, which is cut with the grain parallel with its length, will be sufficient to prevent the usual tendency of celluloid to expand or contract, and that the celluloid renders the scale practically indestructible. That will be a point for experience to show.

Breach of Building By-Laws.—At a recent meeting of the Woking County Bench, D. G. Bayliss was summoned by the Woking District Council for a breach of their building by-laws, and pleaded not guilty.—Mr. R. Mossop, clerk to the Council, explained that the offence committed was in respect of a shed erected by the defendant at St. John's, on a narrow piece of land abutting on the canal. It was 25 ft. by 20 ft., and 7 ft. high, and was built on wooden supports with an iron roof. It was within 2 ft. or 3 ft. of another wooden building, and within 12 ft. or 15 ft. of a stable. The sides of the shed were of wood and wire netting. The only cases where such sheds were exempt from the by-laws were when they were 30 ft. away from any other building, and the same distance from the boundary of adjoining premises, or when the walls were entirely enclosed by iron. The building was used for keeping a pony and cart in, also some chickens. The state of things described would be very dangerous in the event of fire.—Defendant: The insurance company accepted the risk.—Evidence having been given by Mr. G. J. Wooldridge, Surveyor to the Council, defendant said that the shed was a poultry-house in 1901, and had only been enlarged. There was no manger, and the cart referred to was used for chickens to roost on.—Mr. Mossop contended that even if what defendant said were true, there could be no doubt that the additions constituted a new building under the by-laws.—The Chairman said a fine of 20s. would be imposed, and reminded defendant that he was still liable if he allowed the shed to stand.—*Surrey Advertiser.*

The Manchester School of Architecture.—We learn from the *Manchester Guardian* that the syllabus has been issued of the new Manchester School of Architecture, which has been called into existence by the joint arrangements of Owens College, the Municipal School of Technology, the Municipal School of Art, and the Manchester Society of Architects. Professor S. H. Capper has been appointed director of the new school. His career began at Edinburgh University, where he took first-class honours in classics. Thence he went to Heidelberg, and afterwards he took a special course of architectural study at the Ecole des Beaux Arts, in Paris. Returning to Scotland, he practised for some years the profession of architecture in Edinburgh, and was in the course of time appointed lecturer at the University and examiner for the Master of Arts degree in art history and archæology. Seven years ago Mr. Capper went to Canada, where he held at the M'Gill University in Montreal a similar position to that which he has now taken up in Manchester. The work of students in the School of Architecture will be carried on partly at Owens College, partly at the Municipal School of Technology, and partly at the Municipal School of Art, and the syllabus has been arranged, in consultation with Professor Capper, by a committee upon which Mr. J. W. Beaumont and Mr. Paul Ogden represent the Manchester Society of Architects and, of course, the practical interests of their profession. This new School of Architecture will provide Manchester with educational opportunities which it has not hitherto possessed. There has been for some time a School of Architecture in Liverpool, under Professor Simpson, which has done good work, and the Victoria University had an honours school of architecture leading to the B.A. degree; but hitherto there has been no such school in Manchester. Professor Capper's students will have the opportunity of proceeding to the degree of the Victoria University and taking honours in architecture, just as those of Professor Simpson had before the partition of the colleges. A first-year course has been mapped out for students who intend to take the degree of the Victoria University in the Honours School of Architecture, and the inclusive fee for the full course has been fixed at eighteen guineas. There are, in addition, certain special courses at lower fees. For example, there will be a course on the history of architecture delivered at the Owens College on Tuesday and Thursday mornings. In this course Professor Capper will make a general survey of architectural history from ancient Egypt to modern times, with special reference to the evolution of styles and to constructional forms and methods. The course includes ancient Egypt and Assyria, Greece, Rome, Byzantine and early Christian architecture, Romanesque, Monastic, Gothic, Renaissance. The fee will be 2*l.* 12s. 6d. On Friday mornings he will give at the Municipal School of Technology a course on the elements of architecture; the classical orders, Greek and Roman, their mouldings and details; arcading, classical and Gothic; Gothic mouldings and details, their construction and design; elements of architectural effect; composition and style, and so on. The fee for this course will be 1*l.* 11s. 6d. Drawing classes will meet at the School of Technology for the study of programmes and exercises set in connexion with the lectures on the elements of architecture and in the class on architectural drawing and design, and Professor Capper will examine and criticise the work of the students. Classes for freehand drawing and modelling will meet at the Municipal School of Art. It will not be attempted in the University course to supersede that side of training for professional practice which is only fully gained by practical employment in offices and works. The University course is intended chiefly to provide for a thorough grounding in the principles upon which professional practice is ultimately based.

Buildings in Glasgow.—At a meeting of Glasgow Dean of Guild Court held recently, the Lord Dean of Guild—Lord Inverclyde—referred to the work passed by the Court during the past twelve months. The total valuation of the linings granted was 2,200,773*l.* as compared with 2,549,698*l.* during the previous year. The linings granted numbered 603, of which 170 were for dwelling-houses and shops, 12 for public buildings, 19 for churches, halls, and schools, 134 for warehouses and shops, 228 for alterations and additions, and 40 for new streets, extending to 11,683 yards, or about seven miles. Of linings for dwelling-houses granted, 765 were of one apartment, and 2,117 of two apartments. The single and double apartment houses were mostly in the Eastern, St. Rollox, and Maryhill districts, while of linings for three and more apartments by far the greater number were for Queen's Park district. The Lord Dean of Guild further remarked that in a general way the feeling of the Court was greatly against the granting of linings for the erection of buildings in hollow squares, except in exceptional cases. It seemed in every way desirable that, in the more thickly populated districts of the city in particular, there should be the greatest possible amount of open spaces within the bounds of hollow squares, not only for sanitary reasons, but for the general well-being of the large population, who were in many instances thronging the buildings on the four sides of the squares, and to whom light, and air space, was of the very greatest consideration.—*Scotsman.*

Manchester Water Supply.—At a meeting of the Waterworks Committee of the Manchester City Council, held recently, it was reported that there was at present a stock of water equal to 109 days' supply. The engineer stated that during the past fortnight 1¼ miles had been laid of the second pipe to Thirlmere. Up to the present 31 miles had been laid out of a total length of 45 miles. It is anticipated that the line will be completed in 12 months. The committee have under consideration the question of proceeding with a third pipe to Thirlmere as soon as the second pipe is completed.

CAPITAL AND LABOUR.

Plumbers' Strike, Stockton.—The strike of plumbers at Stockton is assuming more serious aspects. The whole of the men employed in the town are out, and the building trade is becoming affected. The employers are trying to fill strikers' places from outside. The men came out nearly three weeks ago as a protest against an alleged violation of the working rules by one of the firms employing non-unionists.—*Newcastle Leader.*

Sunderland Joiners' Dispute.—A mass meeting of the Sunderland joiners was held on the 25th ult., in connexion with the dispute which has existed between the house joiners and the master builders for fourteen weeks. The question, it will be remembered, was submitted to arbitration, and Mr. A. A. Hudson, the referee appointed by the Board of Trade, awarded that the advance asked for by the men, from 9½d. to 10d. per hour, should not be granted. At last night's meeting the text of the award was read over, and the men agreed to start work again on Monday, and the chargemen will resume their duties this morning.—*Newcastle Chronicle.*

LEGAL.

EMPLOYERS' LIABILITY ACT.

HOW SHOULD OLD CONCRETE BE TAKEN UP?

At the Brompton County Court (London), on Tuesday, before Judge Stonor and a jury, Frederick B. Giles, a builders' labourer, 39, Malva-road, Wandsworth, S.W., sought to recover damages under the Employers' Liability Act, against Messrs. Perry and Co., builders and contractors, Tredegar Works, Bow, E., the claim being in respect of personal injuries, said to have been sustained owing to negligence on the part of the defendants or their servants.

Mr. J. W. Moyses, counsel, appeared for the plaintiff, and Mr. W. Duckworth, counsel, for the defendants.

Plaintiff's counsel stated that on June 4 last his client was in the employ of the defendants, assisting in some building operations at the District Railway's new generating station at Lots-road, Chelsea, S.W. Some old concrete had to be taken up by means of large steel wedges or "pins" and heavy hammers. The plaintiff was told by the "ganger" on the job to hold one of these "pins" with his hand, while another workman, slinging the hammer over his head, struck the top of the "pin," and so broke up the concrete. The work went on well for a time, but missing his aim, the man with the hammer struck the plaintiff a terrible blow on the hand, crushing it against the concrete.

The plaintiff bore out counsel's statement, adding that he had several times asked the ganger for iron tongs with which to hold the pin, but was told that there were none, and that he must do the best he could. The top of the pin also was worn, and the face of the hammer might have been a little the worse for wear.

In cross-examination, the plaintiff denied that there was hoop iron, hazel wisps, or osier sticks with leathern thongs upon the job, to use in steadying the pins or wedges.

The Judge: The question seems to be one of *volenti non fit injuria*—whether this man voluntarily took the risk, or whether he used his hands only under fear of dismissal.

Counsel for the plaintiff referred to the well-known case of Smith *v.* Baker, which he said was practically "on all fours" with the present case, and in which Lord Halsbury held that there was no "*volenti*," adding that if "*volenti*" were to apply to such a case, it would apply to the case of every person who crossed the streets in London.

Samuel Hazledon, the labourer who swung the hammer causing the accident, stated that there were no tongs of any kind upon the job for holding the steel wedges.

Mr. C. R. Griffiths, architect and surveyor, stated that for such work as that in question iron tongs, hazel wisps, or sticks with leather thongs should be supplied, by which the men could steady the steel wedges.

Cross-examined, witness said that hoop iron was not the recognised means by which the wedges or pins should be held; hoop iron was occasionally used for the purpose, but it was not so good as proper tongs.

Richard McKay, a man working on the job, also said that he asked the ganger for tongs, and the reply was that he would have to get on with the work without them.

Cross-examined: Pieces of hoop iron were sometimes used for the work, but they were not much good. Hoop iron was used for holding the pins after the plaintiff's accident, but not before.

Medical evidence having been given regarding the plaintiff's injuries,

Frederick Chas. Jordan, the general foreman on the job, was called for the defence. Witness stated that there was an ample supply of hazel wisps, osier sticks, and hoop iron upon the spot, and these were used by some of the men both before and after the accident.

In cross-examination, witness said that men frequently used only their hands to steady a steel wedge while another man struck it with a heavy hammer, and he considered that such a course was perfectly safe.

William Smith, the ganger on the job, stated that there was plenty of hoop iron for the men to use, although no tongs were supplied. He had often seen such wedges held simply by the hand. They had hazel wisps in the stores which the men could have had by asking for them. It was true that he had been asked for some wisps, but he did not get them at the time; he told the men to use hoop iron.

John Goodram, another ganger on the job, also stated that there was plenty of hoop iron lying about on the spot. Personally, he would rather hold one of the wedges with his hand alone, if he knew that the other man could strike properly.

The jury found: That the way in which the work in question was carried on was generally dangerous and improper; that the plaintiff did the work under fear of dismissal; and they assessed the damages in the plaintiff's favour at 200*l*.

His Honour gave judgment accordingly, and allowed costs.

ANCIENT LIGHT DISPUTE.

The case of Godson *v.* Robinson and Fisher was mentioned to Mr. Justice Bucknill in the Vacation Court on Wednesday, on an application by the plaintiff for an interim injunction to restrain the defendants from interfering with his ancient lights until the trial or further order.

On the case being called on counsel in support of the application said that counsel appearing for Robinson and Fisher, but who was not instructed to appear for the builder, wished for time to answer affidavits, and subject to his lordship's consent it had been arranged that the present injunction, granted by his lordship, should be continued, viz., an injunction to restrain the building going on so as to darken the ancient lights of the plaintiffs. It was arranged that so far as these two defendants were concerned that injunction should be continued until next Wednesday, when the case would be heard. In the circumstances he (counsel) asked his lordship to continue the injunction he had granted ex parte against the builder until next Wednesday.

His Lordship: Yes; I know all the facts.

LITIGATION AS TO ANCIENT LIGHTS.

The case of Foster *v.* Waring was mentioned to Mr. Justice Bucknill, sitting as Vacation Judge last Wednesday, on an application by the plaintiff for an interim injunction restrainng the defendant until the trial from building so as to obstruct the plaintiff's ancient lights.

Mr. Bramwell Davis, K.C., for the defendant, said that he had arranged with Mr. Edward Ford, counsel for the plaintiff, that the defendant should give an undertaking in the terms of the notice of motion, the plaintiff undertaking in damages, and on these conditions, that the motion should stand over until the second motion day next sittings.

His lordship assented to the application.

PATENTS OF THE WEEK.

APPLICATIONS PUBLISHED.*

19,471 of 1902.—A. G. Bayles and J. Untermann: *Radiators Heated by Gas or Oil Stoves.*

A radiator for burning gas or oil, having a plurality of heating tubes is provided with a plurality of baffle plates, mounted in the upper part of each tube. The edges of the plates are provided with teeth to insure the more rapid heating thereof. A single cross-bar is also provided for each parallel series of tubes, and the plates suspended in the different tubes of the series from this single cross-bar. The plates may be strung on a rod, and separated from each other by intervening sleeves.

20,399 of 1902.—W. Kleuser: *Locks for Doors and Similar Objects.*

A safety lock having a key-hole allowing the introduction of a key bit in two different positions, and a safety bolt and tumbler adapted to secure the main bolt and the door latch in their locking positions.

* All these applications are in the stage to which opposition to the grant of Patents upon them can be made.

23,341 of 1902.—P. R. J. Willis. (W. R. Mudd): *Fire-Resisting Windows, Ventilators, Doors, and the like.*

A window made of hollow metal, having sashes provided with flanges and a frame, provided with grooves in which said flanges fit, the sashes having offsets adapted to engage each other when closed, said grooves, flanges, and offsets being so arranged relatively to each other that when closed the window is impervious to dust, rain, and fire. The said frame is provided with sections having flanges, said sections adapted to be fitted removably in the frame and held or suspended therein by means of a hooked or turned over portion engaging a flanged portion of the lintel.

23,602 of 1902.—E. H. Klawitter: *Bolts Applicable to Doors and Gates.*

This relates to bolts and means for locking them in position, consisting essentially of a plate with (or without) a cover, having mounted thereon a projecting spindle, on which is fixed a disc (or lever) to which the inner ends of two or more slotted and recessed sliding bolts are attached, and means for guiding, intermittently operating, locking, releasing, and causing them to engage with or to be disengaged from the retaining loops or recesses fixed to the door jambs or floor.

25,850 of 1902.—J. O. Klimsch, A. Beschorner, C. A. Wels, and J. V. Ruston: *Manufacture of Slabs, Tiles, Sheets, and Other Forms of Material Similar to Marble Ceramic Ware and the like.*

Manufacture of slabs, sheets, tiles, and the like with enamel-like surface, and similar in appearance to marble or ceramic ware, consisting in mixing a saturated magnesium chloride solution with waste products such as bone-meal, beet residues, leyes, bran, or with peat or cellulose, and, if necessary, with the addition of a binding material such as flour, or resin powder, the resulting compound being then mixed with burnt and pulverised magnesite, and if necessary with colouring pigment, after which the material is subjected to drying and solidifying upon or between smooth or patterned slabs or plates.

6,217 of 1903.—C. W. Raymond: *Brick Cutting Machines.*

In a brick-cutting machine, a feed table, and a cutting-reel having a continuous rotary motion, and adapted to cut a series of bricks at a time from a clay bar advanced thereto by said feed table.

16,079 of 1903.—W. K. L. Dickson: *Window Catches and the like.*

An automatic locking device for window fasteners and the like, consisting of a spring adapted to be depressed by the latch in closing, and to rise and lock the latch when it is passed over the spring, which is provided with an arm or the like, whereby it may be depressed by hand from inside and the latch released; a shield being provided over the spring whereby depression of the spring and release of the catch from outside are prevented.

23,497 of 1902.—G. C. Brown: *Hinged Sliding Window Sashes to Open Inwardly.*

This invention relates to hinged sliding window sashes, and has for its object the provision of means whereby both upper and lower sashes may be readily opened inwardly for cleaning. A pair of hinges is fixed to the batten rod for the lower sash, the fixed flap having a short ward at each end, and the other flap consists of a longer ward to fit between. This in each hinge is provided with a U-shaped slot which receives a round-headed stud to fasten the flap down to the sash which can thus be readily opened inwardly. The opposite batten rod is secured in a closed position by a special form of screw fastener. When two sash weights are used, means are provided for supporting the one on the side opposite to that on which the hinges are fixed.

23,773 of 1902.—C. Showell: *Hinges.*

This relates to the construction of wrought metal hinges, in which the joint is formed by rolling or folding over the metal to form the eye for the joint pin. Blanks are cut out of sheet metal, leaving gapped projections, which are folded to form the eyes, and in addition smaller projections, or studs, are formed at the outer ends of the said projections, and in alignment therewith, and upon the body or plate portion holes are pierced so that when the projections are bent over to form the joint these studs shall pass through the fixed holes and then be rivetted on the other side.

16,359 of 1903.—F. C. Roberts: *Joints for Brickwork of Furnaces, Roasters, and the like.*

This relates to the construction of joints for brickwork for furnaces, flues, and chambers subjected to high temperatures, which will permit the expansion of the brickwork without cracking. During the building of the furnace perishable pillars of wood or other material are provided between the opposing faces of the bricks which form the joints. When the structure becomes heated the pillars char or burn out, so that expansion can take place without distortion or weakening of the brickwork.

19,385 of 1902.—W. L. Mitchell and W. L. Mitchell, Jun.: *Method of Constructing Hinges for Manhole-Doors or Lids and Frames for Sewers and Tunnels.*

A method of constructing hinges of doors for manholes, for sewers or tunnels, which consists of a recess fixed or cast in the sides of the frame and a corresponding projection on sides of the door, which projection fits into the recess and allows the door to be lifted out of the frame, or to swing open as by a hinge; a stop or projection being provided which fits into the recess and allows the door to be lifted out only in a certain position.

20,303 of 1902.—T. Lewicki: *Process for the Revivification of Filtering Materials.*

A process for revivifying filtering material, consisting in supplying the matter remaining in the filter with artificially-bred organisms for the purpose of producing the required fermentation in a few hours.

20,388 of 1902.—H. G. Butler: *Dredging and Excavating Machines.*

In an excavating machine, consisting in the combination with a car body, of supporting axles towards the opposite sides of the car body and an intermediate car axle, wheels upon said axles, unyielding connexions between the intermediate axle and car body at the rear side of the car between the side axles and car body at the forward part of the car, yielding connexions between the intermediate axle and car body at the forward side of the car between the side axles and car body at the rear side of the car, car propelling gear connected with the intermediate axle, and connecting rods between the car wheels at opposite sides of the car.

20,878 of 1902.—J. C. Quinn: *Manufacture of Artificial Stone or Similar Substances.*

The manufacture of artificial stone or the like by the following process, viz.:—Making a creamy magma of hydrated lime; thoroughly mixing this first with slate dust and water, and thereafter adding meta-silicic acid, and subjecting the mixture to pressure in a mould.

22,840 of 1902.—C. Dressler: *Manufacture of Glazed Tiles, Bricks, and Other Articles of Earthenware.*

In the manufacture of glazed tiles, and other articles of earthenware, coating or gumming the surface of each tile or other article to be glazed whilst the same is in "biscuit" form, with a solution of soluble silicate or equivalent substance that will be absorbed by the tile or other article and will produce an even and non-porous surface thereon, and afterwards applying a layer of slip to the coated or gummed surface preparatory to the application thereto of glaze or enamel.

23,664 of 1902.—H. W. Chappell: *Manufacture of Tiles, Slabs, and the like.*

A process for the manufacture of tiles, slabs, bricks, and similar articles, consisting in pressing to shape a mixture of sand and lime, indurating the articles by treating them with carbonic acid gas, and finally submitting them to a high temperature in a furnace.

23,680 of 1902.—J. S. Rigby: *Manufacture of Concrete Flags, Blocks, or Other Articles.*

A process for the manufacture of cement concrete flags, blocks, or other articles, consisting in mixing Portland cement and aggregage, subjecting such concrete to a pressure in a mould, then removing said article from the mould and allowing same to set, and then subjecting said article to steam or hot water under a pressure above that of the atmosphere.

23,771 of 1902.—E. Deane: *Stonebreakers.*

In a stonebreaker consisting in the combination with the frame and a member movably mounted thereon of a crank shaft, a connecting rod or pitman, comprising downwardly projecting side parts and a transversely extending connecting bar, at the end of the connecting rod or pitman, and a toggle bearing between the frame and the said movable member thereon, engaged by the transverse bar of the connecting rod or pitman, the inward ends of the toggle being inside the downwardly projecting side parts of the connecting rod or pitman.

23,815 of 1902.—J. A. King: *Fireproof Floors and Ceilings.*

Fireproof ceilings, consisting in the combination of flanged girders or joists with arched lintels or bricks having downward extending flanges, adapted to form the two sides of an air chamber, the top of which is formed by the girder or joist and the bottom by ceiling laths.

24,038 of 1902.—L. Whittaker and C. Whittaker and Co., Ltd.: *Moulds of Brick Presses or the like.*

Moulds for brick or like presses having wedge-shaped recesses in the walls thereof and corresponding wedge-shaped lining pieces fitting into the said recesses.

24,445 of 1902.—G. L. Brown: *Fireproof Roofs.*

A roof covering comprising a series of concrete slabs suitably supported, said slabs having projecting sides covered with a suitable capping, the lower end of one slab adapted to overlap the upper end of the adjoining slab.

25,429 of 1902.—J. E. Kirkpatrick: *Manufacture of Bricks and Compositions Capable of Withstanding Very High Temperatures and for Use in Steel and other Furnaces.*

The manufacture of bricks and compositions capable of withstanding very high temperatures from crude magnesite of a high degree of purity, such as that found in many parts of Southern India, by the following process, viz.:—(1) Dead burning the magnesite to free it from carbon dioxide and any other volatile or organic impurities it may contain. (2) Crushing the dead burnt magnesite to powder. (3) Exposing the crushed dead burnt magnesite to the atmosphere and frequently turning it over. (4) Mixing the crushed dead burnt magnesite after exposure to the air with a small proportion of its weight of borax. (5) Adding only sufficient water to the material to enable it to be conveniently handled in a mass. (6) Moulding the mass to the required shape. (7) Drying the moulded mass, and (8) Burning the dried moulded mass at a high temperature.

161 of 1903.—J. H. Knight: *Machines for Laying Bricks for Buildings.*

This relates to machines for laying bricks for buildings, and consists of a number of structural improvements in such machines. In order to make the girder stiff and to keep the machine near to the vertical posts, the depth of the girder is utilised for the machine to travel on, the machine either sliding on the girder or running on small wheels or rollers. In order to allow the machine to commence work at ground level, three or more holes or sockets are made in the frame of the machine in which the horizontal bars which carry the actual laying apparatus can be inserted, so that the position of the laying part of the machine can be altered relatively to the position of the girder. In order to keep the bond better than it can be done by hand, the lever which carries the feeding pawl or ratchet is coupled to a crank, arm, or eccentric on a shaft which revolves once in the length of half a brick, which shaft derives its motion from the forward movement of the machine. When a header or transverse brick is presented to the machine, the pawl at once catches it and drives it home; when stretchers or parallel bricks are fed, on the first revolution of the crank the pawl simply runs forward and backward over the surface of the bricks, and on second revolution it catches them, and then drives them home. A spring or safety appliance is inserted in the connecting rod. The angular position of the crank in reference to the position of the machine on the girder can be altered by stops on the shaft, or by altering the angles of the tooth-wheel and pinion which work the same. This is necessary, as in different courses the vertical joints are a quarter brick in advance or behind the previous ones. To lay the mortar, mortar is run out by hand from a box or hopper, and in order to smooth it down and ensure an equal quantity of mortar throughout the work, a striking board is arranged and fixed either in advance of the actual machine, or on a separate slide or carriage running on the girder.

12,095 of 1903.—M. Perkiewiez: *Manufacture of Bricks.*

A method of protecting bricks from deposits and the like during burning by coating them with a solution of gelatine to which flour is added.

14,448 of 1903.—M. J. Murphy: *Bricks.*

A brick comprising a facing carrying lugs on its rear side, said lugs having contracted portions, and a body portion of cement applied to said rear side of the facing while in a plastic state, whereby the cement may engage in said contracted portions of the lugs and form a locking engagement therewith when the cement is in a hardened state.

16,663 of 1903.—T. Beevers and The Safety Tread Syndicate, Ltd.: *Staircases.*

This invention relates more particularly to the construction of metal staircases, and the invention consists in the mode of building up the staircase, and also in a construction of tread. The invention is applicable to staircases built between walls and to what are known as spandril staircases, the treatment in the several cases being slightly different. In carrying out the invention a series of separate brackets are provided which are built directly into the walls or may be secured to metal stringers, the brackets being provided with dovetail dowels which are built into the walls in any convenient manner. The brackets carry the risers and treads, which may be bolted or otherwise secured thereto.

16,854 of 1903.—S. A. Eddy: *Brickmaking Machinery.*

A brickmaking machine consisting in the combination with a rotating table having a series of brick moulds formed in it, of a chamber mounted above the said table and having an inclined bottom in which is formed an aperture immediately above the path of the brick moulds, the said chamber containing a series of rotating knives or blades adapted to rotate in an opposite direction to the table.

MEETINGS.

FRIDAY, OCTOBER 2.

Architectural Association.—Annual general meeting—President's address, 9, Conduit-street, 7.30 p.m.

SATURDAY, OCTOBER 3.

Northern Architectural Association.—Visit to St. Chad's Church, Bensham. 3.30 p.m.

MONDAY, OCTOBER 5.

Liverpool Architectural Society.—Ordinary meeting 6 p.m. Opening address by the President.

TUESDAY, OCTOBER 6.

Institute of Heating and Ventilating Engineers.—Meeting at Holborn Restaurant. 2.30 p.m.

Institute of Builders.—Half-yearly general meeting, Anchor Hotel, Ipswich, 3 p.m. (Postponed from October 1.)

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

September 15.—By Bentley, Hobbs, & Mytton (at Worcester).

Claines, Worcester.—Tappenhall Estate, 90 a. 1 r. 25 p., f.	£4,000
Lower Town Farm, 82 a. 3 r. 20 p., f.	2,955
Porter's Hill Estate, 76 a. 1 r. 39 p., f.	2,750
Little Park Enclosures, 3 a. 0 r. 2 p. f.	245

September 18.—By W. Brown & Co. (at Great Missenden).

Great Missenden, Bucks.—Hyde Heath Cottage and 10 a. 1 r. 21 p., f. and c.	1,025
Farmhouse and 40 a. 1 r. 12 p., f. and c.	2,500

By G. B. Hilliard & Son (at Chelmsford).

Margaret Roothing, Essex.—Hunt's Farm, 14 a. 2 r. 6 p., f., y.r. 11*l.* 10*s.*	260
Freehold house and garden, y.r. 8*l.*	125
Three freehold cottages, w.r. 12*l.* 12*s.*	210
Roxwell, Essex.—House, malting, and 1 a. 2 r. 29 p., c.	230

September 19.—By C. M. Stanford (at Colchester).

Boxted, Essex.—Boxted Hall Estate, 506 a. 1 r. 30 p., f.	10,000
Enclosure of arable land, 4 a. 0 r. 28 p., f.	110
Long Fen, 4 a. 0 r. 6 p., f.	110
Great Horkesley, Essex.—Hope's Meadow, 10 a. 1 r. 22 p., f.	235

By Maddison, Miles, & Maddison (at Norwich).

Billockby, Norfolk.—Enclosures of land, 13 a. 0 r. 20 p., f.	405
Rollesby, Norfolk.—Enclosure of land, 3 a. 3 r. 8 p., f.	100

September 21.—By May & Philpot.

Brixton.—20, Overton-rd., ut. 58½ yrs., g.r. 4*l.* 10*s.*, e.r. 45*l.*	450

By T. V. Price (at Builth).

Aberedw, Radnor.—Hendre Farm, 87 a., f.	1,670

September 22.—By David Burnett & Co.

Tooting.—14 to 20 (even), St. Cyprian's-st., u.t. 93 yrs., g.r. 24*l.*, w.r. 153*l.* 8*s.*	650

By Nott, Cartwright, & Etches.

Pimlico.—6, Moreton-ter. Mews, u.t. 30 yrs., g.r. 4*l.*, e.r. 28*l.*	195
51, Denbigh-st., u.t. 28 yrs., g.r. 9*l.*, y.r. 80*l.*	475

By Spelmans' (at Yarmouth).

Yarmouth, Norfolk.—9, Nelson-rd. South, u.t. 955 yrs., g.r. 2*l.* 2*s.*, y.r. 34*l.*	680

September 23.—By Percival Hodson.

Finsbury Park.—52, Regina-rd., u.t. 55 yrs., g.r. 6*l.* 6*s.* e.r. 38*l.*	340

By Nicholas, Denyer, & Co.

Great Missenden, Bucks.—Prestwood Lodge Estate, 44 a. 2 r. 3 p., f.	5,950

By Spelmans' (at Yarmouth).

Burgh Castle, Norfolk.—Freehold occupation farm, 32 a. 0 r. 7 p.	830
Various enclosures of land, 31 a. 3 r. 37 p., f.	790
Grazing marshes, 81 a. 2 r. 28 p., f.	1,750
Cantley, Norfolk.—Freehold grazing marsh, 9 a. 0 r. 20 p.	240

By S. Chantry Adams (at Leytonstone).

Leyton.—93, Westdown-rd., u.t. 77½ yrs., g.r. 3*l.* 15*s.*, y.r. 28*l.* 12*s.*	200

By Bridgman & Son (at Hoddesdon).

Nazing, Essex.—Tatefields and 47 a., f., y.r. 100*l.*	2,500

September 24.—By G. F. Box & Co.

Clapton.—83, Cricketfield-rd., f., y.r. 38*l.*	600
Stoke Newington.—80, Rectory-rd., u.t. 69 yrs., g.r. 7*l.*, q.r. 42*l.*	480

By C. C. & T. Moore.

Spitalfields.—6 to 16 (even), Underwood-st., u.t. 44 yrs., g.r. 72*l.*, w.r. 312*l.*	1,200
St. George's East.—21, Princes-sq., f., y.r. 30*l.*.. 172, St. George's-st. (S.), y.r. 45*l.*, and 11, Princes-st., w.r. 36*l.* 8*s.*, f.	1,025
Limehouse.—11, 13, 15, and 17, Beccles-st., f., w.r. 78*l.*	505
Bow.—Bow-rd., The Old Police Station, u.t. 46 yrs., g.r. 28*l.*, p.	650
Forest Gate.—11 to 15, Worsley-rd., u.t. 82 yrs., g.r. 15*l.* 15*s.*, w.r. 110*l.* 10*s.*	660

By Rutters'.

Purleigh, Essex.—Howe Green Farm, 102 a., c., p.	1,150

By Stimson and Sons.

Plumstead, Kent.—36, 36a, and 38, High-st. (houses, shops, and steam joinery and saw mills), y.r. 135*l.*, f.	1,485
Battersea.—38, Corunna-rd., u.t. 40¾ yrs., g.r. 6*l.*, w.r. 68*l.* 18*s.*	545
50, Sterndale-rd., u.t. 60½ yrs., g.r. 3*l.*, w.r. 33*l.* 16*s.*	220
Old Kent Road.—49, Trafalgar-rd., u.t. 13½ yrs., g.r. 7*l.*, y.r. 40*l.*	150
Clapton.—214, Evering-rd., u.t. 70½ yrs., g.r. 8*l.*, y.r. 60*l.*	630
64, Mount Pleasant-la., u.t. 79¼ yrs., g.r. 6*l.* 6*s.*, y.r. 36*l.*	450
Tottenham.—56, St. Ann's-rd., u.t. 72 yrs., g.r. 7*l.*, y.r. 34*l.*	295
285, St. Ann's-rd., u.t. 73 yrs., g.r. 8*l.*, e.r. 45*l.*	415
Chiswick.—42 to 45, William-st., u.t. 34 yrs., g.r. 14*l.*, w.r. 62*l.* 8*s.*	£150

By H. F. Russell & Son (at Presteigne).

Presteigne, etc., Hereford.—Letchmoor Farm, 30 a. 2 r. 2 p., f.	4,800

By A. Spain & Son (at Gravesend).

Gravesend, Kent.—Stuart-rd., a block of freehold building land	700
Cliffe, Kent.—West-st. Farm, 54 a. 2 r. 18 p., f.	2,560
A block of marsh land, 175 a. 1 r. 32 p., f.	3,000

September 25.—By A. Rider & Son.

Notting Hill.—115, Latimer-rd., u.t. 37 yrs., g.r. 6*l.*, w.r. 38*l.*	240
42, Bevington-rd., u.t. 63 yrs., g.r. 7*l.*, w.r. 53*l.* 6*s.*	400

By A. J. Sheffield.

Vauxhall.—116, 118, and 120, Vauxhall-walk, c., w.r. 136*l.* 10*s.*	705
Stratford.—201, High-st. (S.), u.t. 50 yrs., g.r. 8*l.*, e.r. 45*l.*	350
Forest Gate.—64, South Esk-rd., f., e.r. 32*l.* 10*s.*	310
Ilford, Essex.—3, Wellesley-rd., f., e.r. 34*l.*	435
Cheshunt, Herts.—Goff's-la., Oak Cottages (two), f., w.r. 27*l.* 6*d.*	295
144, High-st., f., y.r. 28*l.*	305

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; gr. for grove; b.h. for beer-house; p.h. for public-house; o. for offices; s. for shops.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£ s. d.		
Hard Stocks	1 16 0	per 1,000 alongside, in river.	
Rough Stocks and Grizzles.....	1 13 0	,,	,, ,,
Facing Stocks....	2 12 0	,,	,, ,,
Shippers	2 5 0	,,	,, ,,
Flettons	1 10 0	,,	at railway dep't
Red Wire Cuts ..	1 13 0	,,	,, ,,
Best Fareham Red	3 12 0	,,	,, ,,
Best Red Pressed Ruabon Facing	5 0 0	,,	,, ,,
Best Blue Pressed Staffordshire ..	4 5 0	,,	,, ,,
Do. Bullnose	4 11 0	,,	,, ,,
Best Stourbridge Fire Bricks	4 5 0	,,	,, ,,
Glazed Bricks.			
Best White and Ivory Glazed Stretchers.....	13 0 0	,,	,, ,,
Headers	12 0 0	,,	,, ,,
Quoins, Bullnose, and Flats.....	17 0 0	,,	,, ,,
Double Stretchers	19 0 0	,,	,, ,,
Double Headers..	16 0 0	,,	,, ,,
One Side and two Ends.....	19 0 0	,,	,,
Two Sides and one End	20 0 0	,,	,,
Splays, Chamfered, Squints.....	20 0 0	,,	,,
Best Dipped Salt Glazed Stretchers and Headers	12 0 0	,,	,, ,,
Quoins, Bullnose, and Flats.....	14 0 0	,,	,, ,,
Double Stretchers	15 0 0	,,	,, ,,
Double Headers..	14 0 0	,,	,, ,,
One Side and two Ends.....	15 0 0	,,	,,
Two Sides and one End	15 0 0	,,	,,
Splays Chamfered, Squints.....	14 0 0	,,	,, ,,
Second Quality White and Dipped Salt Glazed	2 0 0	,,	less than best.

	s. d.	
Thames and Pit Sand	5 0	per yard, delivered.
Thames Ballast	6 0	,, ,,
Best Portland Cement	30 0	per ton, delivered.
Best Ground Blue Lias Lime..	20 6	,, ,,

Note.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime	12s. 0d. per yard, delivered.
Stourbridge Fire-clay in sacks	27s. 6d. per ton at rly. dpt.

STONE.

	s. d.	
Bath Stone—delivered on road waggons, Paddington depôt	1 6½	per ft. cube.
Do. do. delivered on road waggons, Nine Elms depôt	1 8½	,, ,,
Portland Stone (20 ft. average)—		
Brown Whitbed, delivered on road waggons, Paddington depot, Nine Elms depot, or Pimlico Wharf	2 1	,, ,,
White Basebed, delivered on road waggons, Paddington depot, Nine Elms depot, or Pimlico Wharf....	2 2½	,, ,,

	s. d.	
Ancaster in blocks	1 11	per ft. cube, deld rly. dep't
Beer ,, ...	1 6	,, ,,
Grinshill ,, ...	1 10	,, ,,
Darley Dale in blocks..	2 4	,, ,,
Red Corsehill ,,	2 5	,, ,,
Closeburn Red Freestone	2 0	,, ,,
Red Mansfield ,,	2 4	,, ,,

PRICES CURRENT (*Continued*).

STONE.

YORK STONE—*Robin Hood Quality.*

	s.	d.		
Scappled random blocks	2	10	per ft. cube, deld. rly. depôt.	
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2	3	per foot super.	,,
6 in. Rubbed two sides Ditto, Ditto	2	6	,,	,,
3 in. Sawn two sides slabs (random sizes)	0	11½	,,	,,
2 in. to 2½ in. Sawn one side slabs (random sizes)	0	7½	,,	,,
1½ in. to 2 in. ditto, ditto	0	6	,,	,,
Scappled random blocks	3	0	per ft. cube	,,
6 in. sawn two sides, landings to sizes (under 40 ft. sup.)	2	8	per ft. super.	,,
6 in. Rubbed two sides Ditto	—		,,	,,
3 in. sawn two sides slabs (random sizes)	2	2	,,	,,
2 in. self-faced random flags	0	5	,,	,,
Hopton Wood (Hard Bed) in blocks	2	3	per ft. cube.	
,, ,, ,, 6 in. sawn both sides landings	2	7	per ft. super. deld. rly. depôt	
,, ,, ,, 3 in. do.	1	2½	,,	,,

SLATES.

in.	in.	£	s.	d.		
20 × 10	best blue Bangor	13	2	6	per 1000 or 1200 at ry. dep	
20 × 12	,, ,, ,,	13	17	6	,,	,,
20 × 10	best seconds ,,	12	15	0	,,	,,
22 × 12	,, ,, ,,	13	10	0	,,	,,
16 × 8	best ,,	7	0	0	,,	,,
20 × 10	best blue Portmadoc ,,	12	12	6	,,	,,
15 × 8	best blue Portmadoc	6	12	6	,,	,,
20 × 10	best Eureka unfading green	13	2	6	,,	,,
20 × 12	best Eureka unfading green	17	2	6	,,	,,
18 × 10	,, ,,	12	10	0	,,	,,
16 × 8	,, ,,	10	5	0	,,	,,
20 × 10	permanent green	11	10	0	,,	,,
18 × 10	,, ,,	9	10	0	,,	,,
16 × 8	,, ,,	6	19	0	,,	,,

TILES.

	s.	d.			
Best plain red roofing tiles	42	0	per 1,000, at rly. depôt.		
Hip and valley tiles	3	7	per doz.	,,	,,
Best Broseley tiles	50	0	per 1,000	,,	,,
Do. Ornamental Tiles	52	6	,,	,,	,,
Hip and valley tiles	4	0	per doz.	,,	,,
Best Ruabon Red, brown or brindled Do. (Edwards)	57	6	per 1,000	,,	,,
Do. ornamental Do.	60	0	,,	,,	,,
Hip tiles	4	0	per doz.	,,	,,
Valley tiles	3	0	,,	,,	,,
Best Red or Mottled Staffordshire Do. (Peakes)	51	0	per 1,000	,,	,,
Do. Ornamental Do.	54	6	,,	,,	,,
Hip tiles	4	1	per doz.	,,	,,
Valley tiles	3	3	,,	,,	,,
Best "Rosemary" brand plain tiles	48	0	per 1,000	,,	,,
Do. Ornamental Do.	50	0	,,	,,	,,
Hip tiles	4	0	per doz.	,,	,,
Valley tiles	3	3	,,	,,	,,

WOOD.

	At per standard. £	s.	d.	£	s.	d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	15	10	0	16	10	0
Deals: best 3 by 9	14	10	0	15	10	0
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	11	10	0	12	10	0
Battens: best 2½ by 6 and 3 by 6	0	10	0	less than 7 in. and 8 in.		
Deals: seconds	1	0	0	less than best		
Battens: seconds	0	10	0	,,	,,	,,
2 in. by 4 in. and 2 in. by 6 in.	9	0	0	9	10	
2 in. by 4½ in. and 2 in. by 5 in.	8	10	0	9	10	
Foreign Sawn Boards— 1 in. and 1¼ in. by 7 in.	0	10	0	more than battens.		
¾ in.	1	0	0	,,		
Fir timber: Best middling Danzig or Memel (average specification	At per load of 50 ft. 4	10	0	5	0	0
Seconds	4	5	0	4	10	0
Small timber (8 in. to 10 in.)	3	18	6	3	15	0
Small timber (6 in. to 8 in.)	3	0	0	3	10	0
Swedish balks	2	15	0	3	0	0
Pitch-pine timber (30 ft. average)	3	5	0	3	15	0

JOINERS' WOOD.

	At per standard. £	s.	d.	£	s.	d.
White Sea: First yellow deals, 3 in. by 11 in.	23	0	0	24	0	0
3 in. by 9 in.	21	0	0	22	10	0
Battens, 2½ in. and 3 in. by 7 in.	17	0	0	18	10	0
Second yellow deals, 3 in. by 11 in.	18	10	0	20	0	0
,, ,, 3 in. by 9 in.	17	10	0	19	0	0
Battens, 2½ in. and 3 in. by 7 in.	13	10	0	14	10	0
Third yellow deals, 3 in. by 11 in. and 9 in.	15	10	0	16	10	0
Battens, 2½ in. and 3 in. by 7 in.	11	10	0	12	10	0
Petersburg: first yellow deals, 3 in. by 11 in.	21	0	0	22	10	0
Do. 3 in. by 9 in.	18	0	0	19	10	0
Battens	13	10	0	15	0	0
Second yellow deals, 3 in. by 11 in.	16	0	0	17	0	0
Do. 3 in. by 9 in.	14	10	0	16	0	0
Battens	11	0	0	12	10	0
Third yellow deals, 3 in. by 11 in.	13	10	0	14	0	0
Do. 3 in. by 9 in.	13	0	0	14	0	0
Battens	10	0	0	11	0	0

PRICES CURRENT (*Continued*).

WOOD.

	£	s.	d.	£	s.	d.
White Sea and Petersburg:— First white deals, 3 in. by 11 in.	14	10	0	15	10	0
,, ,, 3 in. by 9 in.	13	10	0	14	10	0
Battens	11	0	0	12	0	0
Second white deals 3 in. by 11 in.	13	10	0	14	10	0
,, ,, ,, 3 in. by 9 in.	12	10	0	13	10	0
,, ,, ,, battens	9	10	0	10	10	0
Pitch-pine: deals	16	0	0	18	0	0
Under 2 in. thick extra	0	10	0	1	0	0
Yellow Pine—First, regular sizes	33	0	0	upwards.		
Oddments	22	0	0	24	0	0
Seconds, regular sizes	24	10	0	26	10	0
Yellow Pine Oddments	20	0	0	22	0	0
Kauri Pine—Planks, per ft. cube	0	3	6	0	4	6
Dantzig and Stettin Oak Logs—Large, per ft. cube	0	2	6	0	3	6
Small ,, ,,	0	2	3	0	2	6
Wainscot Oak Logs, per ft. cube	0	5	0	0	5	6
Dry Wainscot Oak, per ft. sup. as inch	0	0	7	0	0	8
¾ in. do. do.	0	0	6½	-	-	-
Dry Mahogany—Honduras, Tabasco, per ft. sup. as inch	0	0	9	0	0	11
Selected, Figury, per ft. sup. as inch	0	1	6	0	2	0
Dry Walnut, American, per ft. sup. as inch	0	0	10	0	1	0
Teak, per load	17	0	0	21	0	0
American Whitewood Planks— Per ft. cube	0	4	0	-	-	

Prepared Flooring—	Per square.					
1 in. by 7 in. yellow, planed and shot	0	13	6	0	17	6
1 in. by 7 in. yellow, planed and matched	0	14	0	0	18	0
1¼ in. by 7 in. yellow, planed and matched	0	16	0	1	1	6
1 in. by 7 in. white, planed and shot	0	11	6	0	13	6
1 in. by 7 in. white, planed and matched	0	12	0	0	14	0
1¼ in. by 7 in. white, planed and matched	0	14	6	0	16	6
¾ in. by 7 inch yellow matched and beaded or V-jointed boards	0	11	0	0	13	6
1 in. by 7 in. do. do. do.	0	14	0	0	18	0
¾ in. by 7 in. white do. do.	0	10	0	0	11	6
1 in. by 7 in. do. do. do.	0	11	6	0	13	6

6-in. at 6d. to 9d. per square less than 7-in.

JOISTS, GIRDERS, &c.

	In London, or delivered. £	s.	d.	Railway Vans, per ton. £	s.	d.
Rolled Steel Joists, ordinary sections	6	5	0	7	5	0
Compound Girders ,, ,,	8	2	6	9	5	0
Angles, Tees and Channels, ordinary sections	7	17	6	8	17	6
Flitch Plates	8	5	0	8	15	0
Cast Iron Columns and Stanchions, including ordinary patterns	7	2	6	8	5	6

METALS.

	Per ton, in London. £	s.	d.	£	s.	d.
IRON— Common Bars	7	10	0	8	0	0
Staffordshire Crown Bars, good merchant quality	8	0	0	8	10	0
Staffordshire "Marked Bars"	10	10	0	-	-	-
Mild Steel Bars	8	15	0	9	5	0
Hoop Iron, basis price	9	5	0	9	10	0
,, ,, galvanised	17	0	0	-	-	-

(* And upwards, according to size and gauge.)

Sheet Iron, Black.— Ordinary sizes to 20 g.	9	15	0	-	-	-
,, ,, to 24 g.	10	15	0	-	-	-
,, ,, to 26 g.	12	5	0	-	-	-
Sheet Iron, Galvanised, flat, ordinary quality— Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	13	15	0	-	-	-
,, ,, 22 g. and 24 g.	13	5	0	-	-	-
,, ,, 26 g.	14	5	0	-	-	-
Sheet Iron, Galvanised, flat, best quality:— Ordinary sizes to 20 g.	26	0	0	-	-	-
,, ,, 22 g. and 24 g.	16	10	0	-	-	-
,, ,, 26 g.	18	0	0	-	-	-
Galvanised Corrugated Sheets:— Ordinary sizes, 6 ft. to 8 ft. 20 g.	12	15	0	-	-	-
,, ,, 22 g. and 24 g.	13	5	0	-	-	-
,, ,, 26 g.	14	0	0	-	-	-
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker	11	15	0	-	-	-
,, ,, 22 g. and 24 g.	12	15	0	-	-	-
,, ,, 26 g.	14	0	0	-	-	-
Cut nails, 3 in. to 6 in.	9	5	0	9	15	0

(Under 2 in. usual trade extras.)

LEAD, &c.

	Per ton, in London. £	s.	d.	£	s.	d.
LEAD—Sheet, English, 3 lbs. & up.	13	15	0	-	-	-
Pipe in coils	14	5	0	-	-	-
Soil pipe	16	15	0	-	-	-
Compo Pipe	16	15	0	-	-	-
ZINC—Sheet— Vieille Montagne ton	26	0	0	-	-	-
Silesian	25	15	0	-	-	-
COPPER— Strong Sheet per lb.	0	0	10½	-	-	-
Thin ,,	0	0	11½	-	-	-
Copper nails ,,	0	0	11	-	-	-
BRASS— Strong Sheet per lb.	0	0	10	-	-	-
Thin ,,	0	0	11	-	-	-
TIN—English Ingots ,,	0	1	4	-	-	-
SOLDER—Plumbers' ,,	0	0	6	-	-	-
Tinmen's ,,	0	0	5	-	-	-
Blowpipe ,,	0	0	9	-	-	-

PRICES CURRENT (*Continued*).

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2½d.	per ft.	delivered.
,, fourths	1½d.	,,	,,
21 oz. thirds	3½d.	,,	,,
,, fourths	2½d.	,,	,,
26 oz. thirds	3½d.	,,	,,
,, fourths	3d.	,,	,,
32 oz. thirds	4½d.	,,	,,
,, fourths	4½d.	,,	,,
Fluted sheet, 15 oz.	2½d.	,,	,,
,, 21 oz.	3½d.	,,	,,
½ Hartley's Rolled Plate	1½d.	,,	,,
⅜ ,, ,, ,,	2d.	,,	,,
½ ,, ,, ,,	2½d.	,,	,,

OILS, &c.

		£	s.	d.
Raw Linseed Oil in pipes or barrels	per gallon	0	1	10
,, ,, ,, in drums	,,	0	2	2
Boiled ,, ,, in pipes or barrels	,,	0	2	1
,, ,, ,, in drums	,,	0	2	5
Turpentine, in barrels	,,	0	3	8
,, in drums	,,	0	3	10
Genuine Ground English White Lead	per ton	19	0	0
Red Lead, Dry	,,	19	0	0
Best Linseed Oil Putty	per cwt.	0	8	0
Stockholm Tar	per barrel	1	12	0

VARNISHES, &c.

	Per gallon. £	s.	d.
Fine Pale Oak Varnish	0	8	0
Pale Copal Oak	0	10	6
Superfine Pale Elastic Oak	0	12	6
Fine Extra Hard Church Oak	0	10	0
Superfine Hard-drying Oak, for Seats of Churches	0	14	0
Fine Elastic Carriage	0	12	6
Superfine Pale Elastic Carriage	0	16	0
Fine Pale Maple	0	16	0
Finest Pale Durable Copal	0	18	0
Extra Pale French Oil	1	1	0
Eggshell Flatting Varnish	0	18	0
White Copal Enamel	1	4	0
Extra Pale Paper	0	12	0
Best Japan Gold Size	0	10	6
Best Black Japan	0	16	0
Oak and Mahogany Stain	0	9	0
Brunswick Black	0	8	6
Berlin Black	0	16	0
Knotting	0	10	0
French and Brush Polish	0	10	0

PUBLISHER'S NOTICES.

THE INDEX (with TITLE-PAGE) for VOLUME LXXXIV. (January to June, 1903) was given as a supplement with the number for July 11.

CLOTH CASES for Binding the Numbers are now ready, price 1s. 6d. each; also

READING CASES (Cloth), with Strings, price 9d. each.

THE EIGHTY-FOURTH VOLUME of "The Builder" (bound), price Twelve Shillings and Sixpence.

SUBSCRIBERS' VOLUMES, on being sent to the Office, will be bound at a cost of 2s. 6d. each.

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CHARGES FOR ADVERTISEMENTS.

COMPETITIONS, CONTRACTS, ALL NOTICES ISSUED BY CORPORATE BODIES, COUNTY AND OTHER COUNCILS, PROSPECTUSES OF PUBLIC COMPANIES, SALES BY TENDER, LEGAL ANNOUNCEMENTS, &c. &c.

Six lines, or under ..... 6s. 0d.
Each additional line ..... 1s. 0d.

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PREPAYMENT IS ABSOLUTELY NECESSARY.

*** Stamps must not be sent, but all sums should be remitted by Postal Orders, payable to J. MORGAN, and addressed to the Publisher of "THE BUILDER," Catherine-street, W.C.

Advertisements for the current week's issue are received up to THREE o'clock p.m. on THURSDAY, but "Classification" is impossible in the case of any which may reach the Office after HALF-PAST ONE p.m. on that day. Those intended for the Outside Wrapper should be in by TWELVE noon on WEDNESDAY.

ALTERATIONS IN STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same must reach the Office before TEN o'clock on WEDNESDAY MORNING.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

PERSONS Advertising in "The Builder" may have *Replies addressed to the Office*, Catherine-street, Covent Garden, W.C. *free of charge*. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage. Unused stamps are returned to advertisers the week after publication.

AN EDITION Printed on THIN PAPER, for FOREIGN and COLONIAL CIRCULATION, is issued every week.

READING CASES, { NINEPENCE EACH. By Post (carefully packed) 1s.

TERMS OF SUBSCRIPTION.

"THE BUILDER" (Published Weekly) is supplied DIRECT from the Office to residents in any part of the United Kingdom, at the rate of 19s. per annum (52 numbers) PREPAID. To all parts of Europe, America, Australia, New Zealand, India, China, Ceylon, &c., 26s. per annum. Remittances (payable to J. MORGAN) should be addressed to the publisher of "THE BUILDER," Catherine-street, W.C.

SUBSCRIBERS in LONDON and the SUBURBS, by prepaying at the Publishing Office 19s. per annum (52 numbers) or 4s. 9d. per quarter (13 numbers) can ensure receiving "The Builder" by *Friday Morning's Post*.

COMPETITIONS, CONTRACTS AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITION.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
*New Cotton Exchange	Liverpool Cotton Association, Ltd.	Not Stated	No date.

CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, &c., supplied by	Tenders to be delivered
House, Longacre-road, Carmarthen	.....	G. Morgan & Son, Architects, King-street, Carmarthen	Oct. 1
Brick bound. wall, Wallness Elec. Stn., Frederick-rd	Salford Corporation	Borough Engineer, Town Hall, Salford	Oct. 5
School, Pickering, Yorks	Lady Lumley's Grammar S. Govnrs.	J. Bilson, Architect, 23, Parliament-street, Hull	do.
Wharf, Royal Victoria Dock, London, E.	G. W. R. Co.	G. K. Mills, Paddington Station, London	Oct. 6
Bridge-works, Cricklade-road, Swindon	do.	do.	do.
Cottage, Legacy near Ruabon, N. Wales	do.	do.	do.
Cottage, Raglan-road, near Llandenny Station, Mon.	do.	do.	do.
Additions to Goods Shed, Maesteg Station, Glam.	do.	do.	do.
Road Works, Borneo-street	Walsall Corporation	Borough Surveyor, Bridge-street, Walsall	do.
Private Street Works, New Springs, near Wigan	Aspull D.C.	Heaton & Co., Surveyors, Wigan	do.
Slating Works at Gasworks	Hereford Corporation	W. Parlby, Gas Engineer, Gasworks, Hereford	do.
Kerbing Works, &c., Balfour-crescent	Wolverhampton Corporation	Borough Engineer, Town Hall, Wolverhampton	do.
Additions to Buildings, Union Mills, Pudsey, Yorks	.....	C. S. Nelson, Architect, 15, Park-row, Leeds	do.
Billiard-room, &c.	Alnwick Mechanics' Institute	Secretary, Mechanics' Institute, Alnwick	do.
Sewers, &c., Westfield-lane	Mansfield (Notts) Town Council	R. J. Vallance, Borough Surveyor, Mansfield	do.
Road Metal (1,900 tons)	Bedlingtonshire U.D.C.	— Brown, Surveyor, Bedlington	do.
Water Mains, &c., Beckenhall	Taunton R.D.C.	T. Goldsworthy-Crump, Surveyor, Taunton	do.
Portland Cement (1,000 tons)	Aberdeen Harbour Commissioners	R. G. Nicol, Engineer, Aberdeen	do.
Erection of the Royal Oak Inn, Dartmouth	Mr. H. Swayne	E. H. Back, Civil Engineer, Dartmouth	do.
Surface Water Drain and Manholes, Church-road	Cheriton (Kent) U.D.C.	Surveyor, Council's Offices, Cheriton	do.
Caretaker's Lodge at Hospital, Kirkby Quarry	Hemsworth (Yorks) R.D.C.	—. Richardson, Architect, Hemsworth	Oct. 7
Water Supply Works	do.	T. H. Richardson, Engineer, Hemsworth	do.
Road Works, Thoroughgood-road and other roads	Clacton U.D.C.	A. R. Robinson, Surveyor, Town Hall Buildings	do.
Generating Station and Shed	Kilmarnock Corporation	R. Blackwood, Borough Surveyor, Market Bridge, Kilmarnock	do.
Bridge Works, Wilts and Berks. Canal	Swindon Corporation	Lacey & Sillar, Engineers, 78, King-street, Manchester	do.
Sewers, &c., Caverswall-lane, Blythe Bridge	Cheadle R.D.C.	J. S. Cox, Council Offices, Cheadle	Oct. 8
Rebuilding a House, Bassenthwaite Halls, Keswick	Mr. Thos. Ewart	J. Watson, 1, Museum Square, Keswick	do.
Sewers &c.	Sunderland Corporation	Borough Surveyor, Town Hall, Sunderland	do.
Laying Underground Telephone Pipes (Contract No. 7)	Manchester Corporation	City Surveyor, Town Hall, Manchester	do.
Additions to House and Stabling, Bepton, Sussex	.....	W. Buck, Architect, Horsham	do.
Five Houses and Shops, Cwm, near Ebbw Vale, Mon.	.....	E. N. Johnson, Architect, Risca, Mon	Oct. 9
Sewers, &c., Meltham, near Huddersfield	.....	J. B. Abbey & Son, Civil Engineers, New-street, Huddersfield	do.
*New Coast Guard Station, Walton Creek	The Admiralty	Director of Works Department, 21, Northumberland-avenue, W.C.	do.
Schools, Alfred-street, Harpurhey	Manchester Corporation	Borough Surveyor, Town Hall, Manchester	Oct. 10
Free Library, Salter-row, Pontefract	.....	Garside & Pennington, Architects, Pontefract	do.
Three Houses, Colwyn-road, West Hartlepool	.....	F. E. Boaz, York-road, West Hartlepool	do.
House, Shibden, Yorks	.....	Walsh & Nicholas, Architects, Harrogate	do.
Thirty Houses, Seven Sisters, near Neath	Mr. E. E. Bevan	J. Cook Rees, Architect, Neath	do.
Wood Annexe, &c., at Cattle Market, Geldern-road	Leeds Corporation	F. Mitchell, Architect, Albion-street, Leeds	do.
Business Premises, Ballinamallard, Ireland	Mr. H. A. Burke	T. Elliott, Architect, 37, Darling-street, Enniskillen	do.
Seven Cottages, Ireland	Downpatrick R.D.C.	E. Nolan, Engineer, Workhouse, Downpatrick	do.
Terra-cotta for Alfred-street Schools	Manchester Education Committee	Borough Surveyor, Town Hall, Manchester	do.
Wall, Newgate Gapway	Margate Corporation	A. Borg, Borough Surveyor, Town Hall, Margate	Oct. 12
Water Supply Works, East Kent District (Contract 2	do.	A. Latham, Civil Engineer, 15, Cecil-square, Margate	do.
Schools, &c., Nantyglo	Aberystwith School Board	R. L. Roberts, Architect, Abercarn	do.
Water Supply Works	Bedford Corporation	H. Tulloch, Engineer, 28, Victoria-street, S.W.	do.
Filter Beds, &c., Blackbog	Hamilton (N.B.) Waterworks Coms.	W. R. Copland, Civil Engineer, 146, West Regent-street, Glasgow	do.
Outfall Sewer, &c.	Bridgwater R.D.C.	W. A. Collins, Engineer, 120, West-street, Bridgwater	do.
Drainage Works, &c.	do.	do.	do.
Soldiers' Home, Fair Green, Mullingar, Co. Meath	The Committee	A. E. Joyce, Architect, Mullingar, Ireland	do.
Sewerage Work, 3½ miles, Gedling, &c., nr. Nottin'h'm	Basford R.D.C.	Elliott & Brown, Engineers, Nottingham	do.
Laying Sewers, London-road, St. Helens	Hastings Corporation	P. H. Palmer, Civil Engineer, Town Hall, Hastings	do.
Bridge Works, Padiham	Lancs County Council	County Bridgemaster, Council Offices, Preston	do.
*Making up Roads	Beckenham U.D.C.	Council's Surveyor, Beckenham	do.
*Roadmaking and Paving Works	Willesden District Council	Council's Engineer, Dyne-road, Kilburn, N.W.	Oct. 13
Fireproof Floors, &c., at Asylum, Donegal	The Committee	J. P. M'Grath, Architect, Foyle-street, Londonderry	do.
Road Materials, &c.	Carshalton U.D.C.	W. W. Gale, Civil Engineer, High-street, Carshalton	do.
Sewage Works Extension, &c.	Ilford U.D.C.	H. Shaw, Civil Engineer, Town Hall, Ilford	do.
*Roadmaking and Sewer Works	Hornsey U.D.C.	Council's Engineer, 99, Southwood-lane, Highgate, N.	do.
Clearing Site	Bethnal Green Borough Council	Borough Surveyor, Town Hall, Bethnal Green	do.
*External Repairs at Relief Station, Stockwell-road	Lambeth Guardians	Guardians' Offices, Brook-street, Kennington-road, S.E.	Oct. 14
*Supply of Horse Brooms and Slop Carts	Woolwich Borough Council	Borough Engineer, Maxey-road, Plumstead, S.E.	Oct. 15
Pilework, West-road Quay Wall to the New Cut	Ipswich Dock Commissioners	T. Miller, Civil Engineer, 9, Thoroughfare, Ipswich	do.
Earthenware Drain Pipes	Croydon Town Council	F. C. Lloyd, Town Hall, Croydon	do.
*Extension of Post Office at Hereford	Commissioners of H.M. Works, &c.	H.M. Office of Works, Storey's Gate, S.W.	Oct. 16
*Supply of Articles for 12 months	Metropolitan Railway Company	Company's Storekeeper, Neasden Station, N.W.	Oct. 19
*Erection of Repairing Shed and Shops, Neasden	do.	Secretary's Office, 32, Westbourne-terrace, W.	do.
*Road, Sewer, and Tarpaving Works	Hendon U.D.C.	Council's Engineer, Council Offices, Hendon	do.
*Heating and Ventilating New Cuncl. Schls., Brislington	Bristol Education Committee	Holbrow & Oaten, 9, Clare-street, Bristol	do
*Extension of Boiler House, at Workhouse	Paddington Guardians	F. J. Smith, Architect, Parliament Mansions, Victoria-street, S.W.	Oct. 20
*Engine Shed, &c., Acton	G.W.R. Co.	Engineer, Paddington Station, W	do.
*Additions to Police Station, Portland	Dorset Standing Joint Committee	County Surveyor, Shire Hill, Dorchester	Oct. 27
Water Supply Works	Kingsbridge (Devon) U.D.C.	T. W. Latham, Engineer, Kingsbridge	Nov. 2
*Shops and Sunday School Premises, Swindon	Wesleyan Methodist Trustees	W. F. Bird, Architect, Midsomer Norton, Somerset	No date.
Sunday School, &c., Cardigan-lane, Leeds	.....	Danby & Simpson, Architects, 10, Park-row, Leeds	do.
Shop and Residence, High-street, Southwold, Suffolk	Mr. F. Eastaugh	A. Pells, Architect, Beccles	do.
Sewers, &c., Blacker-road, Staincross, Barnsley	.....	Crawshaw and Wilkinson, Surveyors, 13, Regent-street, Barnsley	do.
Hall, Pontypool	Presbyterian Church of Wales	Habershon, Fawckner, & Co., Architects, 41, High-st., Newport, Mon.	do.
Electric Lighting Works	East Barnet Valley U.D.C.	H. York, Surveyor, Station-road, New Barnet	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Required.	Salary.	Application to be in
*Clerk of Works	Heston and Isleworth U.D.C.	4l. 4s. per week	Oct. 8
*Draughtsman and Clerk	Cambridge Univ., &c. Waterwks.Co.	Not Stated	Oct. 13
*Assistant Clerk (Borough Engineer's Department)	Hackney Borough Council	104l.	Oct. 15
*Civil Engineering Draughtsman	Admiralty	Not Stated	No date.

Those marked with an asterisk (*) are advertised in this Number. Competition, iv. Contracts, iv. vi. viii. & x. Public Appointments, xviii. & xix.

TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the article or drawing, when received, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays.* [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

ALNWICK.—For the supply of road metal, for the Urban District Council. Mr. Geoffrey Wilson, Town Surveyor, Council Offices, Green Bat, Alnwick:—

For Division No. 1 (Moor Roads).

	Per cubic yard at depots. s. d.
Wm. Appleby, Bank Top, Alnwick	7 0

For Division No. 2 (Town Streets).

Wm. Appleby, Bank Top, Alnwick	6 0

For Division No. 3 (South and East Roads).

Thomas Coxon, Denwick, Alnwick	6 0

AMMANFORD.—For building three houses and shops for Mr. Jonathan Jones, Llangadock. Mr. David Jenkins, F.R.I.B.A., architect, Llandilo:—
William Evans, Tirydail, Ammanford, £1,205.*

BRIDLINGNON.—For the lengthening of the Clough Bridge, for the Corporation. Mr. E. R. Matthews, C.E., Town Hall, Bridlington:—

Urinal, Crane Wharf.

J. H. Hudson	£241 15	J. Sawdon, Bridlington*	£185 0
W. Barnes	219 0		
C. Simon	212 10		

Retaining Wall, Clough Bridge.

J. H. Hudson	£408 19 6	J. Sawdon, Bridlington*	£249 0 0
R. Musk	337 0 0		
W. Barnes	318 16 0		

BRIDLINGTON.—For the erection of a greenhouse, Quay-road, for the Corporation. Mr. E. R. Matthews, C.E., Town Hall, Bridlington:—
W. Nettleship, Quay-road, Bridlington...£127 10*

BRISTOL.—For the erection of Hanham-road schools, Kingswood, for the Gloucestershire Education Committee. Mr. John Mackay, architect, Richmond-place, Kingswood, near Bristol. Quantities by Mr. Maynard Stroud, Bristol:—

Forse & Low	£14,500 0 0	Cowlin & Son	£12,350 0 0
Walton & Son	13,570 0 0	Wilkins & Sons	11,874 0 0
Bennett Bros.	13,385 0 0	Adams & Jefferies, Oldland Common, Bristol*	11,306 0 0
Love Bros.	12,885 0 0		
J. Browning	12 734 0 0		
G. Humphreys	12,680 0 0		
E. Clark	12,600 0 0		
Stevens & Bastow	12,418 0 0	J. E. B. James	10,795 19 8
A. J. Beaven	12,390 0 0		

Plumbing and Gas Fitting.

Slade & Bridgman	£780	J. E. B. James	£660
A. & J. Tutcher	730	S. H. Povey	619
G. F. Tuckey	684	Wilkins & Son*	595
Arthur S. Scull	670	A. E. Wilkins	594

Heating by Low Pressure.

Dark Bros.	£748 14	Welch & Sons§	£405 0
Bradford	593 15	Williams & Sons§	400 0
Skinner & Co.*	452 0		

§ Arrangements of scheme not fully estimated, extras required considerably amounted above the accepted tender.

CHEADLE (Cheshire).—For the erection of shops for Messrs. Burgons, Ltd. Mr. Edward Hewitt, F.R.I.B.A., architect, Temple Chambers, Brazennose-street, Manchester. Quantities by Mr. Frank Hewitt, 53, Brazennose-street, Manchester:—

John Hibbert	£3,325	Padmore & Sons	£3,080
Macfarlane & Son	3,295	Burgess & Galt*	3,033
W. L. Adkinson	3,156		

HIGH WYCOMBE.—Town Hall. Messrs. Bateman and A. Hale, architects, Birmingham:—

	Tender.	Deduction for Hollington Stone.	Deduction for Ketton Stone.	Deduction for Bath Stone.	Deduction if with Ordinary Plaster.
	£	£	£	£	£
Smith & Son	12,197	10	132	240	75
Barnsley & Sons	12,160	—	add 125	224	70
Sapcote & Sons	12,043	—	126	210	73
Thos. Rowbotham	12,000	—	add 120	213	73
Rudd & Son	11,843	226	372	498	150
Stephens, Bastow & Co., Ltd.	11,689	add 45	add 130	360	142
Collins & Godfrey	11,586	180	290	450	130
S. F. Halliday	11,545	98	185	315	60
Webster & Canfion	11,388	108	198	248	68
Groves & Sons	11,280	91	181	310—Guiting, 300	100
Lee & Son	11,273	75	115	229	205
Hy. Lovatt	11,190	158	60	339	86
Geo. Darlington	11,180	95	2 0	345	140
Jas. Lovell	11,127	110	110	350	125
Parnell & Son	11,077	56	209	331	98
Gaze & Sons	10,971	130	60	380	30
Hy. Flint	10,787	—	317	537	150
G. H. Gibson	10,738	90	224	362	131
C. H. Hunt & Son, High Wycombe*	10,373	—	100	230	60

CROOKSTON (Renfrewshire).—For the erection of a Poor-House, for the Guardians. Messrs. MacWhannell & Rogerson, architects, 58, West Regent-street, Glasgow:—

Masonry. — George Henderson, 21, Oakshaw-street, Paisley	£18,430 12 9
Carpentry. — J. Baxter & Son, 20, Catherine-street, Glasgow	7,437 10 0
Slating.—A. Robertson, 31, Argyle-street, Glasgow	1,293 14 1
Plumbing. — Scott & Anderson, Barrhead	3,227 15 2
Plastering. — Joseph Graydon, 29, Craigneastock-street	2,729 12 10
Tilelaying.—Galbraith & Winton, 129, St. Vincent-street	2,564 11 4

[Accepted tenders only.]

DOVER.—For additions to small-pox hospital, Poulton, for the Town Council. Mr. H. E. Stilgoe, C.E., Town Hall, Dover:—

Lewis & Sons	£421 0	J. Morgan	£228 0
Gann & Co.	393 0	Geo. Munro, Dover*	255 10

EASTBOURNE.—For the erection of three football and cricket pavilions near Hampden Park, for the Corporation. Mr. D. J. Bowe, Borough Surveyor, Town Hall, Eastbourne:—
Llewellyn, Eastbourne £136

GRIMSBY.—For the erection of a house, Bargate. Mr. H. C. Scaping, architect, Court Chambers, Grimsby:—

Hewins & Goodland	£1,497 0 0	Gilbert & Kirton	£1,367 0 6
Waterman	1,485 10 0	Smith & Hodson, Grimsby,*	1,360 0 0

For the erection of a ladies' bijou residence on the Hadley Wood Estate. Mr. Albert Kingwell, Hadley Wood, architect:—

G. Johnson	£3,589	C. Wheeler	£2,972
A. Mitchell	3,510	F. Minter	2,884
Sprossam & Babb	3,438	Hunt & Co.	2,863
L. & H. Patman	3,100	S. Warboys	2,729
A. Fairhead	3,093	J. Barker	2,727

HAY RURAL DISTRICT COUNCIL.—For the construction of sewerage and sewage disposal works at Talgarth. Mr. R. E. W. Berrington, M.Inst.C.E., engineer:—

E. Powell	£6,852 0 0	Braithwaite & Co.	£5,271 11 0
E. H. Page	5,949 14 2	G. Holloway	5,147 0 0
J. E. Evans	5,898 3 5	J. H. Macdonald*	5,064 9 8
Johnson Bros.	5,710 0 0		
W. H. Reading	5,453 0 0		

Engineer's estimate, £5,397.

HAY RURAL DISTRICT COUNCIL.—For the construction of water-supply works at Talgarth. Mr. R. E. W. Berrington, M.Inst.C.E., engineer:—

J. E. Evans	£7,105 0 0	E. Powell	£4,695 2 8
John Laing	4,857 0 0	Peter Edwards	3,970 0 0
Johnson Bros.	4,400 0 0	G. Holloway	3,767 0 0
Braithwaite & Co.	4,100 0 0	W. H. Reading	3,600 0 0
		J. H. Macdonald*	3,430 0 0

Engineer's estimate, £4,170.

HIGH WYCOMBE.—For the erection of a lodge near isolation hospital, Clay-lane, for the Rural District Council:—

W. H. Salrey	£354 0 0	Nash & Sons,*	
J. Hatherley	250 0 0	High Wycombe	£345 0 0
Senior & Clarke	318 16 6	J. Bond	328 0 0

LIMAVADY.—For the erection of cottages, for the Rural District Council. Mr. J. W. Wilson, Main-street, Limavady:—

McCann & Gillespie, Limavady £529 1 10
(Accepted for four cottages.)
Richard Hall, Limavady 298 2 0
(Accepted for two cottages.)

LLANDEBIE.—For building new class-rooms and alterations to Penygroes School for the Llandebie U.D. School Board. Mr. David Jenkins, F.R.I.B.A., architect, Llandilo:—
Lewis Davies, Penygroes, Llandebie, R.S.O., £1,398.*

LLANDILO.—For alterations to hosiery premises, New-road, Llandilo, for Messrs. D. E. Williams & Co. Mr. David Jenkins, F.R.I.B.A., architect, Llandilo:—
Jones Bros., Tirydail, Ammanford, £3.0.*

LLANDOVERY.—For building a dwelling-house at the Old Chemical Works for Mr. Evan Pritchard, Verdre (brick and stone supplied). Mr. David Jenkins, F.R.I.B.A., architect, Llandilo:—
William Thomas, Trecastle, £379 15s.

LLANGATHEN.—For building a vestry to the Methodist Chapel, Cross Inn, for the Rev. B. B. Griffiths and the Building Committee. Mr. David Jenkins, F.R.I.B.A., architect, Llandilo:—
J. L. and J. Lewis, Dryslwyn, Golden-grove, R.S.O. £296 5s. 6d.*

LONDON.—For rebuilding No. 20, Newgate-street, and No. 7, Rose-street, City of London, for Mr. Wm. Straker. Mr. H. Gardiner Gribble, architect, Woking. Quantities by Messrs. J. Rider, Hunt, & Co., 181, Queen Victoria-street, E.C.:—

Spencer, Santo, & Co.	£5,000	Patman & Fotheringham	£4,923
Sims & Woods	5,000	Johnson & Son, Leicester‡	4,860
Holloway Bros.	4,977		

‡ Accepted subject to modification.

LOWER GORNAL (near Dudley).—For extensions to Robert-street Boys' School, Lower Gornal, for the Sedgley School Board. Mr. A. Ramsell, architect, Dudley:—

J. Herbert	£2,597 0	Cave & Son	£2,330 0
Hilton & Caswell	2,499 4	Oakley & Coulson	2,319 0
T. & S. Ham	2,445 0	J. Dallow	2,300 0
C. Griffiths	2,425 0	M. Round	2,275 0
H. Dorse	2,420 0	E. Seckerson	2,200 0
F. L. Jones	2,391 0	H. Gough, Wolverhampton*	2,190 0
Speke & Sons	2,339 0		

MARAZION (Cornwall).—For the erection of schools. Mr. F. St. Aubyn, architect, Lambe-buildings, Temple, E.C.:—

J. Miners, Marazion, Cornwall	£2,852 10
H. Nicholas, Penzance, Cornwall	2,435 8
G. Miners, Marazion, Cornwall†	£2,050 0
Masonry, Plumbing, and Smithing.	
H. Nicholas, Penzance, Cornwall	1,685 15
Carpentry.	
P. Walters, Penzance, Cornwall	749 0

PONTNEWYDD.—For additions to the Bridge End Inn, for Messrs. W. Hancock & Co., Ltd. Mr. Norman M. Brown, architect, Steam Packet Chambers, Dock-street, Newport, Mon.:—

Dean & Sons	£822	C. Lock	£629
J. Charles	675	R. H. Parkyn*	599
Gough Bros.	669		

PUMPSAINT.—For building sheds for shooting box near Pumpsaint, for Colonel Methuen, Avonwood, Clifton, Bristol. Mr. David Jenkins, F.R.I.B.A., architect, Llandilo:—
David Davies, Bryncrach, Llanwrda, Pumpsaint, R.S.O., £165 2s. 4d.*

REIGATE.—For the erection of a residence at Cronk's Hill, Reigate, for Mr. R. W. Neale. Mr. C. E. Salmon, architect, Bell-street, Reigate:—

J. Knight	£2,217	Elsey & Sons	£1,293
T. Nightingale	1,359	W. Wickman	1,290
Nightingale & Sons	1,250	J. Waycott*	1,150

RHONDDA.—For the execution of sewerage works, Trebanog, for the Rhondda Urban District Council. Mr. W. J. Jones, engineer, Council Offices, Pentre:—

Enoch Bros.	£338	Collins & Co., Barry*	£130
Barnes, Chaplin & Co.	140		

WALTHAMSTOW URBAN DISTRICT COUNCIL.—For providing a low-pressure heating apparatus in the Selwyn-avenue School, for the Education Committee. Mr. H. Prosser, Architect to the Committee:—

Wontner-Smith & Gray	£319 0	W. Cassidy	£295 0
Rosser & Russell	315 0	Russell & Co.	264 10
		Palowkar & Son*.	231 0

LONDON SCHOOL BOARD TENDERS.

At the last meeting of the London School Board the Works Committee submitted the following list of tenders. Mr. T. J. Bailey is the Board's Architect:—

CALVERT-ROAD SCHOOL (Greenwich).—Improvements to Girls' School:—

E. B. Tucker	£2,365 0 0	Bulled & Co.	£1,889 0 0
Martin, Wells, & Co., Ltd.	2,188 0 0	Akers & Co.	1,865 0 0
Leney & Son	2,083 0 0	J. & C. Bowyer	1,850 0 0
Rice & Son	2,019 0 0	H. Groves	1,794 0 0
Holliday & Greenwood, Ltd.	1,943 0 0	Thomas & Edge	1,786 0 0
Mitchell & Son	1,897 0 0	Smith & Sons, Ltd.	1,756 0 0
		Garrett & Son	1,717 8 9
		T. D. Leng*	1,649 0 0

[*See also next page.*

CREEK-ROAD SCHOOL (Deptford).—Halls and other improvements:—

Staines & Son	£3,596	0	0	Thomas & Edge	£2,915	0	0
Martin, Wells, & Co., Ltd.	3,417	0	0	Johnson & Co.	2,906	0	0
Akers & Co.	3,252	0	0	J. Greenwood, Ltd.	2,895	0	0
Smith & Son, Ltd.	3,122	0	0	Garrett & Son.	2,884	3	7
Treasure & Sons	3,055	0	0	T. D. Leng	2,742	0	0
Bulled & Co.	2,972	0	0	General Builders, Ltd.*	2,617	0	0
Rice & Son	2,917	0	0				

DUNCOMBE-ROAD SCHOOL.—For senior mixed school:—

Williams & Son	£11,688	Perry & Co.	£10,987
Gregar & Son	11,572	Lawrance & Sons	10,899
Killby & Gayford	11,510	T. L. Green	10,776
Patman & Fotheringham, Ltd.	11,473	Gough & Co.	10,655
Allen & Sons, Ltd.	11,406	J. & M. Patrick	10,595
Miskin & Sons	11,375	Treasure & Son	10,571
Simpson & Son	11,341	L. H. & R. Roberts	10,427
Grover & Son	11,330	Chessum & Sons	10,354
A. Porter	11,055	Dearing & Son*	10,150

GILL-STREET SCHOOL (Limehouse).—Drainage and sanitary works:—

Ashby Bros.	£2,564 0	J. & C. Bowyer	£2,079 0
Johnson & Co.	2,530 0	J. Peattie	1,998 0
G. Parker	2,449 0	Williams & Son	1,947 0
Willmott & Sons	2,222 0	R. P. Beattie*	1,909 16
Rice & Son	2,130 0		

GOODRICH-ROAD SCHOOL (East Dulwich).—Special school for mentally defective children and a science room:—

Holliday & Greenwood, Ltd.	£4,603 0	Martin, Wells, & Co., Ltd.	£4,413 0
Smith & Sons, Ltd.	4,500 0	Rice & Son	4,366 0
W. Downs	4,499 0	Garrett & Son	4,342 6
E. Triggs	4,490 0	J. & C. Bowyer	4,335 0
Stimpson & Co.	4,459 0	Smith & Son	4,255 0
Bulled & Co.	4,449 0	Appleby & Sons	4,121 0
Mitchell & Son	4,433 0	T. D. Leng*	4,087 0
		Akers & Co.‡	3,611 0

‡ Error in tender.

KENNINGTON-ROAD SITE.—Special school for mentally defective children:—

Martin, Wells, & Co., Ltd.	£3,550 0 0	Smith & Son	£3,261 0 0
Spencer, Santo, & Co., Ltd.	3,529 0 0	Akers & Co.	3,238 0 0
Marsland & Sons	3,421 0 0	E. Triggs	3,210 0 0
Rice & Son	3,367 0 0	General Builders, Ltd.	3,181 0 0
Bulled & Co.	3,336 19 5	Appleby & Sons	3,138 0 0
Mitchell & Son	3,307 0 0	J. & M. Patrick	3,124 0 0
Garrett & Son	3,288 13 10	T. D. Leng*	3,098 0 0
Johnson & Co.	3,261 0 0		

LAVENDER-HILL SCHOOL.—Adapting room for experimental science teaching:—

H. Bouneau	£45 0	General Builders, Ltd.*	£72 0
Spencer & Co.	89 0		
London School Furniture Co.	86 10		

PLUM-LANE SCHOOL (Plumstead).—Heating apparatus:—

Stevens & Sons	£745 0
W. G. Cannon	739 0
J. Grundy	620 0
J. & F. May	608 0
The Brightside Foundry and Engineering Co., Ltd.	558 0
Clark, Bunnett, & Co., Ltd.	538 0
Wontner, Smith, Gray, & Co.	535 15
The Paragon Heating Co.	492 0
Defries & Sons, Ltd.*	481 0

SALTER'S SCHOOL (West Norwood).—Enlargement:—

Smith & Sons, Ltd.	£14,450 0 0	Treasure & Son	£13,370 0 0
Lawrance & Sons	13,813 0 0	J. & M. Patrick	13,328 0 0
Holliday & Greenwood Ltd.	13,635 0 0	Garrett & Son	13,326 12 3
Appleby & Sons	13,500 0 0	Martin, Wells & Co., Ltd.	13,294 0 0
F. & H. F. Higgs	13,462 0 0	Mitchell & Son	13,286 0 0
Stimpson & Co.	13,403 0 0	W. Downs	13,186 0 0
		J. & C. Bowyer	12,993 0 0
		Wallis & Sons*	12,988 0 0

SWAFFIELD-ROAD SCHOOL (Wandsworth).—Heating apparatus for enlargement:—

Sloper & Co.	£448 19	J. & F. May	£362 0
Esson & Son	390 0	Brightside Foundry and Engineering Co., Ltd.	327 0
Clark, Bunnett & Co., Ltd.	386 0	Eates & Sons*	297 5
W. G. Cannon	365 0		

UPTON HOUSE TRUANT SCHOOL.—Fire-escape staircase:—

Ashton & Green Iron Co.	£116 10	R. H. & J. Pearson, Ltd.	£92 0
McDowall, Steven, & Co., Ltd.	113 5	Hayward Bros. & Eckstein, Ltd.*	86 0

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